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Population Dynamics and Livelihood Change on Ukara Island, Lake Victoria

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Tiivistelmä/Referat – Abstract

This study is about the relation between population dynamics and livelihood change in the Kara farming system on Ukara Island, Tanzania. The population densities on Ukara have been exceptionally high since the 18th century, which has been made possible by a complex set of soil conserving measures utilised by the local Kara farmers. According to the data derived from national censuses, the population densities on Ukara have been rising rapidly since the late 1970s.

This research is based on 49 thematic interviews, 87 questionnaires and focused observation conducted during a 5-week ethnographic fieldwork on Ukara Island in early 2012. The majority of interviews were conducted in two villages, Bukiko and Bwisya. The historical changes in land use and population levels were established through a review of relevant literature and official documents. The Sustainable Livelihoods Approach was utilised in framing the inquiry and in analysing the local livelihood portfolios.

The findings show that the local households have been troubled with insufficient amounts of cultivable land for decades, and out-migration has acted as a safety valve in controlling population pressure on land. This has culminated in the voluntary and forced re-settlements of local Kara farmers to the mainland in year 1974 as part of the Ujamaa villagisation programme by the socialist government.

Since the re-settlements, the population densities have risen, however, and three explanations for this have been found. Firstly, the wide-scale adoption of tuber crops cassava and sweet potato, instead of the traditional cereals bulrush millet and sorghum, has allowed the local farmers to produce more calories per hectare than before. The crop choice and reduction of fallow periods seem to be the only major modifications in the local cultivation patterns, and no advanced technologies or inputs are used.

Secondly, the rapid development of the commercial fishery on Lake Victoria has absorbed surplus male labour from the local farming households. Due to the strictly seasonal nature of the fishing of silver cyprinid (dagaa), many of these men are still considered as full members of their sending households and can also contribute to the farming activities when needed.

Thirdly, the new economic opportunities related to the growth of the fishery are allowing many farming households to diversify their livelihood portfolios through many non-farm activities. Nonetheless, it is evident that not all households have equal access to such opportunities, and successful diversification by some households has led to social differentiation and, according to some informants, to diminishing social cohesion.

Avainsanat – Nyckelord – Keywords

East Africa; Ukara; Sustainable livelihoods approach; Rural development; Population density; Intensive agriculture; Diversification

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Tiivistelmä/Referat – Abstract

Tutkimus käsittelee väestödynamiikan ja toimeentulomuotojen muutoksen välistä suhdetta kara-kansan maanviljelyssysteemissä Tansanian Ukara-saarella. Väestöntiheys Ukaralla on ollut poikkeuksellisen korkea 1700-luvulta lähtien, minkä ovat mahdollistaneet paikallisten kara-viljelijöiden käyttämät maan ravinnepitoisuutta säästävät viljelymenetelmät. Virallisten väestönlaskentojen mukaan Ukaran väestöntiheys on kuitenkin noussut nopeasti 1970-luvun lopulta lähtien.

Tutkimuksen aineistona on 49 temaattista haastattelua, 87 kyselytutkimuslomaketta ja fokusoituun havainnointiin perustuvat kenttämuistiinpanot, jotka kerättiin 5-viikon etnografisen kenttätyöjakson aikana Ukaralla vuoden 2012 alussa. Valtaosa haastatteluista toteutettiin kahdessa kylässä, Bukikossa ja Bwisyassa. Pitkän aikavälin muutoksia maankäytössä ja väestökehityksessä tarkasteltiin kirjallisuuskatsaukseen ja virallisiin dokumentteihin perustuen. Kenttätutkimuksen rajaamisessa ja paikallisten toimeentuloportfolioiden analyysissä merkittävässä roolissa oli kestävän toimeentulon lähestymistapa (Sustainable Livelihoods Approach).

Löydökset osoittavat, että paikalliset kotitaloudet ovat kamppailleet viljelyskelpoisen maan riittämättömyyden asettamien haasteiden kanssa jo ainakin vuosikymmenten ajan. Poismuutto on toiminut eräänlaisena varaventtiilinä maahan kohdistuneen väestöpaineen kontrolloimisessa. Poismuutto oli erityisen mittavaa vuonna 1974, jolloin sosialistihallitus siirsi ujamaa-hankkeeseen liittyen saarelta väestöä mantereelle osittain vapaaehtoisuuteen perustuen, osittain väkipakolla. Näiden väestönsiirtojen jälkeen väestöntiheydet Ukaralla lähtivät nopeaan nousuun.

Tässä tutkielmassa väestöntiheyksien nousulle nähdään kolme keskeistä taustasyytä. Ensimmäinen syy liittyy siihen, että Ukaralla siirryttin perinteisistä viljakasveista (durra ja hirssi) viljelemään juurikasveja (maniokki ja bataatti), mikä on mahdollistanut suuremman hehtaarikohtaisen tuotannon kalorimääriin perustuen. Viljelykasvin valinta ja kesantojakson lyhentäminen näyttävät olleen ainoat merkittävät maanviljelyyn liittyvät muutokset, eikä uusia teknologioita tai panoksia ole otettu käyttöön.

Toinen taustasyy löytyy Viktoriajärven nopeasti kasvaneesta kaupallisesta kalataloudesta, joka on imenyt ylimääräistä miestyövoimaa paikallisista maanviljelyskotitalouksista. Pienen dagaa-kalan kalastus on vahvasti kausiluontoista, minkä seurauksena suuri osa näistä miehistä pysyy kotitaloutensa täysivaltaisina jäseninä ja osallistuu tarvittaessa maataloustöihin.

Kolmas taustasyy liittyy siihen, miten paikalliset kotitaloudet ovat pystyneet hyödyntämään kalatalouden avaamia uusia taloudellisia mahdollisuuksia omien, maatilan ulkopuolisten toimeentulomuotojen löytämiseksi. Tutkimuksen perusteella on selvää, että osa paikallisista kotitalouksista on onnistunut tässä merkittävästi kannattavammin kuin toiset, mikä on johtanut sosiaaliseen eriarvoistumiseen ja joidenkin haastateltavien mukaan myös sosiaalisen koheesion heikentymiseen.

Avainsanat – Nyckelord – Keywords

Itä-Afrikka; Ukara; kestävän toimeentulon lähestymistapa; maaseutukehitys; väestöntiheys; intensiivinen maatalous; diversifikaatio

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Upon my arrival to Ukerewe Island, I felt slightly confused, but such sentiments dissolved as soon as I had made friends with the wonderful Paschal Phares. I will always be your brother from the cold. On Ukara, Josefu Mkundi and his family were extremely courteous in showing me around and letting me stay at their homestead. I could not have been expecting such hospitality. I also like to thank all my informants for taking the time to teach me about life on Ukara.

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All of you are brilliant. Absolutely brilliant.

Helsinki, 29th of September, 2014

Tomi Lounio

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1 Introduction

While rural Eastern Africa has been historically rather sparsely populated, there has been a small number of locations with exceptionally high human population concentrations and atypical systems of intensive agriculture. One of these has - since pre-colonial times - been Ukara Island, which is located in the south-eastern part of Lake Victoria, Tanzania. Already during the late 19th century, European explorers visiting the island were intrigued by Ukara's distinctly high human population density[1]. Historically, the sustainability of the elevated population densities on Ukara was made possible by a unique form of agricultural intensification, which has been a source of interest to a number of field researchers (e.g. Thornton & Rounce, 1936; Ludwig, 1968) and a range of scholars who have referred to their findings (e.g. Allen, 1965; Koponen, 1988; Kjekshus, 1996; Reader, 1997; Widgren & Sutton, 2004).

German biologist, Hans Dieter Ludwig completed a one-year-long field work on Ukara in 1964-65, and published a widely referenced monograph (Ludwig, 1968), but some of his findings have become outdated. The special agricultural methods that were indigenously developed by the Kara are based on the careful conservation of the soil fertility through the use of composted animal manure, the utilisation of very high rates of human labour, and the private ownership of all arable land. Put together, these elements have created a truly unusual system of intensive agriculture based on grain cultivation, which has formed the essential core of the Kara culture and the livelihoods on the island. In spite of the limited availability of cultivable land and the low fertility of soils on Ukara, its human population has remained high - and has even surged over the past three decades.

During my 5-week fieldwork on Ukara, however, I realised that the role of agriculture has recently diminished - at least in relative terms - and the remarkable population growth since the 1970s has been predominantly made possible through the local farmers' adoption of tuber crops instead of grains. Simultaneously, there has been a wide-ranging process of livelihood diversification relating to both farm and non-farm activities. The significant modifications found in the livelihood portfolios of the Kara farmers strongly reflect their opportunistic attempts to benefit from the new economic

[1] For instance, the Austrian geographer Oskar Baumann visited Ukara in the early 1890s (Reader, 1997)

openings brought about by the commercial fishing sector. The Kara[2] are not the stagnant agricultural people I had imagined prior to my fieldwork, but have instead increasingly engaged in trade with people living on the other islands and the mainland. The Kara have migrated to new regions, and they have also been affected by the development of large-scale commercial fishing business on Lake Victoria. In my view, these changes explain - more than the adaptations within agriculture alone - how this relatively small island has been able to sustain a rapidly growing population.

The empirical reality on Ukara conforms to the wider adjustments that have been observed throughout Sub-Saharan Africa. It is more and more widely understood how households within this region most often do not rely on a single source of income, but aim at diversifying their income portfolios in order to both minimize future risks and to cope in times of exceptional adversities. Since the late 1990s, livelihood diversification has become a major theme for the analysis of rural poverty in developing countries (e.g. Bryceson, 1996, 1999a, 1999b, 2000; Reardon, 1997; Ellis, 1998; Carswell, 2002). As Barrett et al. (2001, p. 315) have put it: "Diversification is the norm."

Some observers (e.g. Reardon, 1997; Carswell, 2002) have questioned the universality of this process, while admitting that such orientations are evident in many separate locations. The patterns of diversification, however, are not straightforward, but are products of a complex interplay with changes in farm productivity, income distribution and gender relations (Ellis, 1999, p. 2). Some authors view such changes as a result of the dynamics of global capitalism and the unequal inclusion of both people and places (Andersson Djurfeldt, 2014; De Haan & Zoomers, 2005; Ponte, 2002). This perspective is evident in the local economy, as the fishing business of Lake Victoria has grown rapidly, but not always in sustainable ways (Balirwa et al., 2003).

While I came to acknowledge the economic importance of the growing trade and commercialisation, my local informants also explained that these changes in livelihoods have brought about some notable reconfigurations to the social relations and cultural patterns on Ukara. The in-migration of fishermen from many parts of Tanzania, and even Kenya, to the island has brought about many types of new cultural influences that, according to the Kara, are challenging the local modes of living. These influences combined with the increasing competition for land, social differentiation and the erosion

[2] It needs to be noted here that the Kara of Ukara Island do not share origins with the similarly named Kara people of Ethiopia's Omo River Valley.

of traditional community values, seem to be the root causes for the growing social instability and crime on Ukara. Also, the active engagement of the able-bodied male population in the fishing sector has affected the division of labour within households. Migration, especially seasonal and circular labour migration by young men, can be seen as an invaluable part of the livelihoods of many local households on Ukara. Just as Knud Vilby (2007) writes on the case of the neighbouring Ukerewe Island, historically also Ukara's most important 'export product' has been its youthful labourers. As the men spend longer periods of time away from their families, a double burden is being placed on women who must bear more responsibility for farming than before.

I will present the adaptations in livelihood strategies on Ukara as context-bound and socially embedded, in the sense that the local social institutions and norms heavily affect the decisions made within households. Livelihood diversification is a dynamic process that is rarely dictated by the families' economic needs or the incentives available to them alone, but is dependent on the socio-cultural context, local value-systems and traditions. The case of Ukara, however, goes to prove that on one hand these socio-cultural aspects can restrict the households' and individuals' decisions, but on the other hand are fluctuating and flexible over time and space (Scoones, 1998).

It can be stated that the unusual agricultural techniques and exceptionally high population density are the two major factors that make Ukara historically a special case (Ludwig, 1968). Nevertheless, in my opinion the rapid development of the fishing business on Lake Victoria has strongly changed the cultural and economic dynamics on the island. Contrary to the earlier studies on Ukara, I will argue that the current situation on the island can be understood through a detailed analysis of the local households' reactions to the declining fertility of soil and the rising economic opportunities available in the fishing camps and other non-farm activities. Further on in my analysis I will show that the people living on Ukara have only been able to escape, or at least delay, the Malthusian trap of population growth through proactively modifying their patterns of making a living, or in other words: by altering and diversifying their livelihoods.

Some households and individuals have been able to reap considerable benefits, while some others have suffered. I will take a close look at these transformations at the micro-level, and try to explain how the local households on Ukara have responded and adapted to the changing environment. From my point of view, this is an efficient way to attempt solving the 'mystery of Ukara', that is: how a remote, rural island of just 80 km² with

poor soil quality can produce enough food to support nearly 40 000 inhabitants with traditional technologies and no chemical inputs.

2 Research Questions and Limitations of the Study

There is a need to discard the view of African rural communities consisting of homogeneous households engaging solely in subsistence farming. Originally, I embarked on a fieldwork in order to study out-migration from Ukara as a mechanism for controlling and limiting excess population on the island. I had visited Ukara briefly for the first time in early 2011 and became immensely fascinated by it. I knew I wanted to study the island more closely. I read everything I could to understand the history and current dynamics of this densely populated island, but the literature was not plentiful and it was outdated. Based on previous research, I envisioned the Kara as an isolated ethnic community, who cultivated their land in traditional ways and sent out their offspring in search of better prospects for themselves and remittance money for the family members who had stayed behind.

In contrast, during my fieldwork I was surprised to not find a remote, stagnated and mono-ethnic community, but a location full of all sorts of hustle and bustle, hundreds of fishermen and traders representing various ethnicities, and an excessive number of economic activities even in the more remote villages of the island. But this was not my immediate perception of Ukara, for to an outsider it still seems like a dozy place with nothing much going on. It took a week or two for a clearer picture to form in my mind, and I was keen to find out what was actually happening, and why I encountered so many people from other parts of Tanzania, even Kenya, on this tiny island. I had fortunately prepared myself mentally for the fact that quite often real-life situations exhibit a much higher level of chaos and confusion than the researcher's neatly typed research plans.

Little by little the focus of my research changed, because the things that I had seen, heard and encountered were not going to obey to the theories I had scribbled while sitting by my writing desk back home in Helsinki. I became more interested in other aspects explaining Ukara's rapid population growth – namely, the changes taking place in the micro-level livelihood strategies that might explain how it has been possible to sustain such immensely high population density. I wanted to learn why certain individuals had chosen the particular activities they were pursuing in their daily quest for generating enough income to help themselves and their household members thrive. Soon I found out that making a living on Ukara is extremely difficult, but possible nonetheless – provided that an individual or a household use their often limited but

vitally important asset bases in efficient ways. Through the fascinating conversations I shared with my research participants, I also discovered that more and more households on Ukara have begun to engage in various activities. While each household has its own motives and procedures of diversification, some general patterns can be found.

For these reasons I was obliged to modify my research questions. The final versions are the following:

- **What are the most important factors explaining the historically high human population density on Ukara Island?**
- **How and why have the households on Ukara modified their livelihood strategies in the changing social, economic and ecological environment?**
- **How have these modifications in the local livelihood strategies contributed to the rapid rise in population densities on Ukara particularly since the 1970s?**

Formulating research questions that are clearly defined and both spatially and temporally narrow enough, make them eminently answerable (Gerring, 2006, p. 709). I have chosen to explore the historical and current processes of population dynamics on Ukara Island, which are tightly related to the livelihood options taken by the local people. These options are constantly shaped by regional, national and even global processes that partly affect the viability of livelihood opportunities available to the local actors. This becomes particularly evident in the case of the commercial fishing on Lake Victoria, which cannot be understood through a localised perspective alone. According to my local interviewees, livelihood change on Ukara has also been strongly influenced by the national policies of the *ujamaa* villagisation campaign and the forced population re-settlements of the 1970s, as well as the neoliberal structural adjustment policies of the 1990s. At the same time, the demographics and socio-economic characteristics of Ukara have also been forcefully modified by human migration to and from the island. I have wanted to keep my perspective as local as possible, but I will broaden the connections to the wider phenomena throughout this thesis.

The first question “what are the most important factors explaining the high human population density on Ukara Island?” calls for a historical inquiry. I have attempted to fulfil this task by exploring the literature available and performing a type of ‘life history

interviewing' with some senior members of the local community. While I admit that I cannot give an exhaustive explanation to this question, I have still been able to gain a decent understanding of historical change on Ukara. I was able to gather some convincing evidence on the changes that had occurred in agricultural practices, governance, migration and intra-household relations over time. However, I decided to limit the original causes for the agricultural intensification on Ukara outside of the scope of my study, although I will touch upon some of the literature relating to the 'siege hypothesis' in chapter 5.

The historical perspective was nevertheless valuable for guiding my inquiry as far as the second and third questions are considered. Studying livelihoods is about understanding what type of solutions the local people are choosing to take in the changing social, economic and ecological circumstances. The households on Ukara are constantly searching for ways to survive and enhance the quality of their members' lives through utilising their livelihood assets in the best possible ways. But these decisions are not made in a vacuum. Instead, the options available to the households are heavily constrained by the social, economic and ecological context. Neither the household asset bases nor the context are static. Instead, they are constantly changing and evolving, along with the household's resource needs. Understanding livelihood change and its relation to population trends is therefore a complicated task, but I have been able to identify some broader patterns.

Livelihood strategies are dynamic processes that respond to the changing social and economic environment, where the new income-generating opportunities have attracted plenty of youthful population from Ukara and elsewhere. This has led to livelihood diversification, which implies that households try to minimise risks and cope with adversities through targeting several different sources of income. This is particularly accurate for the poorer households. On the other hand, some better-off households with more capital in their possession have regarded diversification as a viable method to accumulate wealth. However, simultaneously these changes pose certain threats to the more traditional ways of life, modifying both intra- and inter-household power relations and altering the ethnic composition of the island. It is easy to look at the statistics and see that in quantitative terms things are changing: every year there are more and more people on Ukara. It is absolutely necessary to hear the voices and perceptions of the

local people themselves in order to produce a richer and more informative analysis, and this is exactly what I am aiming to do.

The literature on livelihood diversification is rather vast and varied, but the key questions for most authors are similar and largely conform to Kate Crehan's (1992, p. 87) formulation: "Who owns what? Who does what? Who gets what? What do they do with it?" Here Crehan refers to the quest to understand both inter- and intra-household behaviour in changing environments – simply put, livelihood dynamics. Similarly Ian Scoones (2009) writes that the starting point should be learning how different people in different places live their lives. Obviously answering these seemingly straightforward questions alone takes time, but even more important are other interlinked issues, namely those that give a clear overview of the context where these decisions are made, those that explain why the households or household members choose to take particular actions, and those that illustrate the outcomes of these decisions.

In the following chapter I will lay out a framework that I have found to be useful for framing my enquiry and for conceptualising my findings. First I will briefly explain the intellectual and theoretical roots of the Sustainable Livelihood Approach, which constitutes the underlying framework for my study. This is followed by a more in-depth look on the particularities of the part of the framework that is most important for my work, namely, livelihood diversification. I will also present and give definitions to the concepts that are more central for my analysis.

3 Theoretical Framework

To thoroughly understand the current patterns of sustaining a household on Ukara Island, there is a need to depart from the pure economic explanations preferred by some analysts[3]. Davis et al. (2010) have noted that it is not feasible to study rural poverty if we do not fully understand the economic decision making processes at the household level. These processes are very likely to be context-bound, as any household and any individual are dependent on the local social institutions and environmental conditions that must be taken into consideration. The Sustainable Livelihoods Approach (SLA) provides one useful way of looking at this multifaceted process of decision-making among rural households.

3.1 The Sustainable Livelihoods Approach

I have found the Sustainable Livelihoods Approach to be of key importance for framing my enquiry, as it constitutes a holistic, wide-ranging and people-centred view to rural change and poverty. In Bryceson's (1999a) opinion, this approach developed as the research community's[4] response to the complexity of rural livelihoods and their growing non-agricultural character. Therefore it is tightly linked to the question of diversification, which is essential for my study. The perspective is actor-oriented, aiming at explaining what type of deliberate actions the individual households take and what kind of livelihood strategies they pursue in their often challenging contexts.

Livelihood approaches have a long history, but they did not enter the mainstream of development debates until the 1990s, as the theories of modernisation and other more mono-disciplinary perspectives were dominating development discourse (Scoones, 2009). During the early 1990s, however, some serious attempts to outline the basics of a livelihoods approach to rural lives were taken by Chambers & Conway (1992) and Bernstein et al. (1992). Their work was later theoretically refined by a number of other authors (e.g. Carswell et al, 1997; Scoones, 1998; Carney, 1998; Ashley & Carney, 1999), which resulted in the SLA gaining momentum during the late 1990s and early 2000s among both academics and policy-makers.

[3] E.g. Harris & Todaro, 1970, an econometric analysis of rural-urban migration.
[4] Especially among academics at the Institute of Development Studies, University of Sussex.

The core element of the approach is its focus on the long-term sustainability of rural livelihoods, instead of looking for quick fixes to low incomes or insufficient consumption levels. The aim should be to sustain these livelihoods through preserving the assets or 'capitals' that are accessible to the household. A major source of debate is related to the question of defining a sustainable livelihood. The most commonly used definition is the one below, given by Chambers and Conway (1992, p. i):

> A livelihood comprises people, their capabilities and their means of living, including food, income and assets. Tangible assets are resources and stores, and intangible assets are claims and access. A livelihood is environmentally sustainable when it maintains or enhances the local and global assets on which livelihoods depend, and has net beneficial effects on other livelihoods. A livelihood is socially sustainable when it can cope with and recover from stress and shocks, and provide for future generations.

Thus, a livelihood is about how the rural poor are making a living, but they are not doing it solely depending on their daily work or other income-generating activities. Instead, they are heavily dependent on their capabilities[5] and assets, in other words, the material and social resources available to them. In the more recent study of sustainable livelihoods, there is a tendency to use the term *capital* instead, a concept that will be further explained below. Sustainability[6] refers to the livelihood's ability to provide a means of living without depleting these capitals or the natural resource base. Potential indicators of sustainable livelihoods may include consumption levels, access to assets, levels of human capital and processes such as resilience or adaptation. (Carswell, 1997.)

3.1.1 The Framework for Analysing Rural Livelihoods

The main advantage of the SLA is that it allows us further comprehension of how livelihood strategies are constructed by rural households. Ian Scoones (1998) has clarified these processes through an illustrative tool, The Sustainable Livelihoods Framework (Figure 1). This framework conceptualises the way in which livelihood assets, vulnerability and transforming structures are in constant interplay (Toner, 2003). On the left side of the framework we find the *vulnerability context* that includes the

[5] The term 'capability' derives from the work of Amartya Sen (1984, 1987) whose ideas have generally been reflected in the theoretisation of the Sustainable Livelihoods Approach.
[6] The concept of 'sustainability' originates in the Brundtland report of 1987, adapted by Chambers & Conway (1992). Through analysing such borrowings it is possible to understand some of the ideological roots of the SLA. (Scoones, 2009, p. 174)

external factors that affect the livelihood, but are beyond the household's control. These may imply *shocks*, *trends,* or *seasonalities.* Shocks are sudden, unpredictable disruptions, such as death of a family member or storm damages to household assets. Trends are more gradual changes, such as declining soil quality or rising costs of food staples or medicines. Seasonality refers to the predictable changes in weather conditions during a calendar year. All these factors may have a more or less severe impact on the household's livelihoods, depending on the household's coping/adapting response. *Coping* implies short-term and *adapting* long-term measures taken to ensure survival. (Scoones, 1998.)

On the right side of the vulnerability context box we find the pentagon of *livelihood assets,* which refer to the five types of capital available for the household. These capitals are essential for forming the basis for the household's *livelihood strategies*. Households construct these livelihood strategies based on the 'capitals' in their possession. *Policies, institutions and processes* (PIPs) are of focal importance, and thus placed in the centre of the diagram. The access to both livelihood assets and livelihood activities is mediated by the PIPs, which include e.g. social relations, markets and organisations. (Allison & Horemans, 2006.) On the furthermost right of the diagram are the *livelihood outcomes*, which ideally include positive targets, such as more income, increased well-being, reduced vulnerability, improved food security and a more sustainable use of the natural resource base. In the following paragraphs I will further clarify the different types of capitals available for the households, after which I will explain the nature of their possible livelihood strategies.

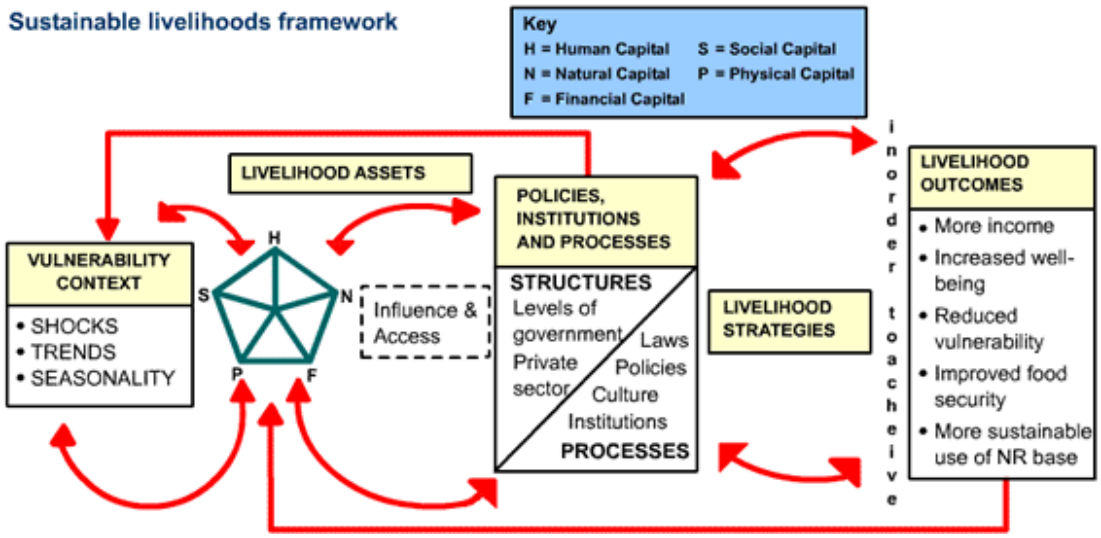

Figure 1: Sustainable Livelihoods Framework,
Source: Scoones, I (1998): Sustainable Rural Livelihoods: a framework for analysis

In the framework, the livelihood assets accessed by the household are divided in the following way: 1) human; 2) natural; 3) financial; 4) social; and 5) physical capital. *Human capital* includes the household members' capabilities, such as education, knowledge, health status and skills. *Natural capital* includes the environmental services and natural resource stocks available to the household. *Financial capital* refers to the capital base of the household, including cash, credit or debt, savings, basic infrastructure and production equipment and technologies. *Social capital* relates to the household's social networks, social claims, relations and affiliations. *Physical capital* concerns all the tools, vehicles, buildings and materials relevant to the household's livelihoods. (Scoones, 1998) These capitals are the basic resources that allow for the household to form their livelihood strategies. In addition to these, it is possible to invent other types of capitals. For instance, Baumann and Subir (2001) have insisted that 'political capital' should be added to the list of livelihood assets, but Toner (2003) argues that the political dimension should automatically be analysed as a part of social capital. It should be evident for any reader that the whole spectrum of human life cannot be crammed into one diagram, but instead the framework can be helpful in guiding the enquiry to achieve a fuller picture of the multitude of factors in play.

3.1.2 Strategies for Achieving Sustainable Livelihoods

The SLA framework is especially relevant to my study for showing how the different livelihood strategies pursued by the households relate to the wider structure of sustainable livelihoods. The strategies do not come out of thin air, but are founded on the vulnerability context, the livelihood assets and mediated by the formal and non-formal institutions. I am personally especially interested in explaining the various livelihood strategies employed by the people living on Ukara. In order to proceed towards this goal, I have followed De Haan et al. (2002) in focussing on three essential livelihood strategies that are: a) agro-pastoral activities; b) livelihood diversification; and c) migration. De Haan et al. (ibid.) clarify the relationship between sustainable livelihoods and diversification further:

> The concept of sustainable livelihoods relates to households' and communities' conditions of poverty, well-being and capabilities, resilience, and their natural resource base. Households attempt to improve these aspects of their livelihoods, or at least try to avoid their deterioration. In improving their livelihoods, households do not rely on agriculture alone – though this has been emphasised in past research. Throughout history, in varying degrees, rural households have undertaken a variety of strategies, local non-farm activities, and migration, often to distant places. (De Haan et al., 2002, p. 38–39)

What becomes apparent in the fragment above is that exploring the decisions made in the sphere of agriculture alone is not sufficient, despite the fact that sustaining agricultural production remains the backbone of most households on Ukara. Instead, I try to offer a wider insight to the livelihoods through including the analysis of both non-farm activities relating to livelihood diversification and, to some extent, discussing the importance of migration. According to my data, diversification and migration are not always separate strategies, because engaging in non-farm activities often entails at least some level of mobility. This overlapping becomes especially noticeable in the case of circular and seasonal migration, because the 'migrants' actually remain full members of their sending households despite spending time labouring elsewhere. This blurs the distinction between activities relating to diversification and migration, as for the households themselves circular/seasonal migration seemed to be about diversifying. The only difference between diversification and circular/seasonal migration is that the latter includes mobility. Having said that, permanent migration typically created a wholly different situation, as the migrant in many cases ceased to be a fully recognised member

of the household. During my interviews, it became apparent that many families had attached hopes of receiving remittance income from those who had migrated, but collecting reliable data relating to the remittance flows proved to be difficult, as my informants were not willing to share detailed information on this issue.

There is a need illuminate the motivations behind the rural households taking on the above-mentioned livelihood strategies. It is important to note that while utilising the capitals in constructing their livelihoods, the rural poor's primary aim is not to maximize profits in the short term. Contrary to this, the families are primarily engaged in the search for a better security against different types of stress or shocks affecting their livelihoods negatively. According to Robert Chambers (1989), this is actually a key aspect of gaining clear comprehension of the rural poor's motivations. In all likelihood, the most important objective for them is to reach *security* against exposure to risks, stress and shocks. Security is the opposite of *vulnerability*, which implies a difficulty in coping with contingencies or other more predictable situations of stress. Therefore, in Chambers' (ibid.) view, vulnerability - more than poverty[7] - is linked to assets rather than to income. He states that poor households often have a 'horror of debt', because even though borrowing and investing may reduce their poverty, having debt simultaneously makes them more vulnerable. This is one explanation for why many rural families prefer minimising risk through livelihood diversification to borrowing money. Naturally another reason is that many poor families in rural areas cannot access credit at all (Davis et al, 2010). In the current discussion about livelihoods, a household's ability to cope with adversities is usually called *resilience*. The more secure a livelihood is, the more resilient it is. According to World Development Report 2014, cohesive and well-connected communities can affect resilience in positive ways through different types of community groups that can be savings and credit associations, burial insurance societies or labour and livestock sharing groups (World Bank 2013, p. 139).

As far as the livelihood strategies on Ukara are concerned, the main agro-pastoral activity on Ukara Island has always been crop cultivation through the utilisation of livestock manure. Generally speaking, typical livelihood strategies within agriculture are *intensification* and *extensification*. The former, intensification, is defined by Tiffen et al. (1994, p. 29) as *"*increased average inputs of labour or capital on a smallholding,

[7] Chambers (1989) defines poverty here simply as low income, in spite of generally strictly opposing such a narrow view to poverty and deprivation (e.g. Chambers & Conway, 1992, p. 2)

either cultivated land alone, or on cultivated and grazing land, for the purpose of increasing the value of output per hectare". The latter, extensification, can be simply defined as "the expansion of cultivated area into previously uncultivated areas" (Carswell, 1997, p. 21). Due to the growing population pressure on the very limited availability of cultivable land, accentuated by the declining soil fertility and prevalence of crop disease, neither of these strategies has been able to offer sustainable solutions. This is why there has been a rapid increase in other types of on-farm and off-farm activities, in other words: livelihood diversification. Also out-migration from Ukara to other islands and to the mainland has played a prominent role in mitigating the population pressure while providing an additional source of income for the local households in the form of remittances sent by the migrants.

3.2 The Dynamics of Livelihood Diversification

In the following paragraphs I will first briefly present the relevant academic discussion on the dynamics of livelihood diversification among rural households. Subsequently, I will review the literature on the role of out-migration for the rural livelihoods.

3.2.1 Conceptualising Diversification

The most focal concept for my analysis is *livelihood diversification*, which according to Ellis (1998), is defined as "*the process by which rural families construct a diverse portfolio of activities and social support capabilities in order to survive and improve their standards of living*". The discussion of livelihood diversification has its roots in the study of rural poverty dating back to the early 1980s, but has been growing in importance since the late 1990s in both academic research and policy-making (Iiyama et al., 2008). The theory of diversification has developed within the Sustainable Livelihood Approach, as it forms one important branch of the livelihood strategies that are mentioned in the livelihoods framework (Fig. 1). The added emphasis on the underlying causes and outcomes of diversification processes have helped to shed light on the complex strategies that African rural households are employing in their pursuit for a better quality of life. The longitudinal data available on the portfolios of income generating activities by the rural poor is rather weak and inconsistent (Ellis, 1998), but it has nevertheless been noted that these portfolios have been getting more diverse than ever before, especially in Sub-Saharan Africa (e.g. Bryceson, 1996).

Ellis (1998) highlights the fact that livelihood diversification is a wider concept than just income diversification, because livelihood encompasses income as well as social institutions, gender relations and property rights that are relevant for making a living. He explains that income includes the household's cash earnings and those payments in-kind that can be valued at market prices. Typically rural households derive cash earnings from the sales of crops or livestock, and wages, rents and remittances. The in-kind components of household income customarily comprise the consumption of own farm produce, payments in-kind, and transfers or exchanges of consumption items between households. (Ibid.)

Ellis (ibid.) further separates the three main categories of income sources, relevant for rural households' livelihood strategies. *Farm income* includes income derived from livestock and crop sales. *Off-farm income* relates to wage or exchange labour on other farms within agriculture. *Non-farm income* covers all non-agricultural income sources, such as non-farm rural wage employment, non-farm rural self-employment, property income (e.g. rents), and both national and international remittances. For my study of livelihood change on Ukara, the non-farm income and activities are of most focal importance, as the new opportunities in the non-farm sector have attracted many younger Kara and absorbed remarkable numbers of surplus labour. Reardon et al. (2001, p. 396) make a further distinction between rural non-farm employment (RNFE) and rural non-farm income (RNFI), the latter being the income generated within the former. This contrast is significant - also regarding the case of Ukara - because it has been noted that the rising RNFE have not necessarily been reflected by a proportional growth in RNFIs (ibid.).

The definition of livelihood diversification given by Ellis (1998) above has been accepted widely, but there has been an intense debate on why livelihood diversification actually occurs and what are the most important factors or determinants affecting the households' decision making processes. Bryceson (1996) has emphasised the view that the primary motivation for diversification for poor households is their willingness to avoid risks. Some other authors (e.g. Speranza (2010) regarding the case of climate change and agro-pastoral livestock production in Makueni District, Kenya) consider that most diversification occurs in times of crisis, that is, as a post-ante response to drought or other sudden environmental or social change affecting their livelihoods negatively. In her analysis of the situation of Mvumi, Dodoma Region, Emma T. Liwenga (2009)

concludes that some specific livelihood activities of the Gogo people are more important in desperate times, whereas some other activities may be seen as pro-active measures that the households are taking under normal conditions in order to sustain their livelihoods in spite of possible future hardships. She notes that especially charcoal making was a typical non-farm activity during times of crop failure, but was not a sustainable source of income in the long run, due to its harmful impact on the local forests. Contrary to this, the bee-keeping practices undertaken by some local men in Mvumi contributed predominantly to the households' ex-ante risk-aversion strategies (ibid.).

Goulden et al. (2013, pp. 907–908) have developed Ellis' model further by distinguishing between three different types of diversification. *Concurrent diversification* occurs, when a household is doing several activities at any one time; *temporal diversification* means that household members change from doing one particular activity to another; and *spatial diversification* implies that a household is spreading its activities geographically. The latter type usually involves spatially separated assets or migration of household members. All these types are actively pursued by many households on Ukara. It is not uncommon to hear of households that are trying to put their labour resources to the best possible use by exercising all of these diversification strategies during the course of a calendar year, or even simultaneously.

Miyuki Iiyama et al. (2008) argue that diversification has been seen as a rational response to the lack of opportunities for specialisation. They view the process as determined by outside factors, namely the insufficiency of a single source of income. Iiyama et al. (ibid.) regard this insufficiency as being dependent on the natural, physical and social capital assets available to the households. In other terms, their remark may be seen as parallel to the notion that in most cases, subsistence farming is not a stable enough source of nutrition due to its seasonality. This difficulty of meeting consumption needs at any time of the agricultural cycle is actually one of the most damaging challenges the rural poor are facing as it affects the health and nutrition of both human population and livestock (Devereux & Longhurst, 2010). *Adverse seasonality* is a key problem of unirrigated agriculture, which is wholly dependent on the weather conditions, most notably rainfall. This is the case on Ukara, where most agriculture is unirrigated and the majority of local farmers face an annual hungry season. The most common method of minimising the risk of severe food shortages on Ukara has been to

switch from cultivation of bulrush millet and sorghum to cassava, which can be harvested all year round. In times of crop failure, the farmers must adopt different types of coping strategies in order to survive. At worst, such reactive ways of coping may affect the household's livelihoods negatively in the long term, for instance through sales of livestock, land holdings or other types of assets.

3.2.2 Social Embeddedness, Reciprocity and their Consequences for Diversification

Rural households do not make their livelihood-related decisions solely on an economic basis, but they are outcomes of careful deliberation where local hierarchies, kinship networks, gender roles and religious or sociocultural norms may restrict or allow for undertaking new types of income-generating activities. Karl Polanyi (1944/1957, p. 46) has explained this by writing that:

> …man's economy, as a rule, is submerged in his social relationships. He does not act so as to safeguard his individual interest in the possession of material goods; he acts so as to safeguard his social standing, his social claims, his social assets.

This notion has been conceptualised as the *social embeddedness* of economic decision making, and is compatible with the Sustainable Livelihoods Approaches' preoccupation with social capital and non-formal institutions. In my opinion, this is a highly relevant remark as far as the households living on Ukara are concerned. The households are not completely free to choose to take on whatever activities they might wish, but they must meticulously consider what kind of implications these decisions may have not only for their material wealth but, even more importantly, for their social standing. Stefano Ponte (2002, p. 153) has clarified this idea further by explaining that the social negotiation of access to resources is based on one's position in a web of relationships on the basis of age, kinship, gender, or political and religious affiliation. Similarly Goulden et al. (2013) explain that livelihood adaptations taken by rural households are based on interactions between people and their collective actions, mediated through kinship, friendship, and informal institutions, as well as government support.

Of additional importance for my analysis is the related concept of *reciprocity*, which according to Polanyi (1957/1944, pp. 47–48) implies the process of giving gifts or helping others within one's kin without expecting immediate payment, but what instead

enforces the relationship between the two through creating an obligation for some type of return in the future. Marshall Sahlins (2004/1974, pp. 191-196) has famously presented a typology of different kinds of reciprocity. In Sahlins' view, *general reciprocity* implies giving gifts with no expectation of an immediate return. But this situation creates an implicit obligation to reciprocate the gift in the future, as Polanyi (1957/1944, pp. 47–48) explained, although Sahlins (2004/1974, p. 194) states that in many cases "[the receiver's] failure to reciprocate does not cause the giver of stuff to stop giving." On Ukara, one example is the help in the form of labour or foodstuffs that is given among one's kin or lineage ('ukoo' in Swahili) or between neighbours. Therefore, a household with good access to networks of general reciprocity tends to possess high levels of social capital, which can lead to good level of resilience. Households with strong social capital are less likely to go hungry than others.

The second type is *balanced reciprocity*, which means that there is an expectation of immediate return. On Ukara, the fishermen who have migrated there tend to lack the necessary networks for exchanges that would allow for general reciprocity, as delaying the payment requires a good level of trust between the parties. I observed the fishermen exchanging fish for cassava with the local farmers, which could be described as balanced reciprocity. The third type in Sahlins' (2004/1974, pp. 195-196) classification is *negative reciprocity*, which refers to a situation where one party wants to get something the other does not want to give, or wants to get it for a payment that is considered as too low. On Ukara, this was evident in many situations of tinkering between parties that did not know each other too well, sometimes including myself. My main method of transportation on the island was a mountain bicycle I had bought in Mwanza town, and it was a major target for numerous attempts of bargaining on a daily basis.

I found that the reciprocal, non-cash exchange is an essential element of the current livelihoods on Ukara, where households often have very limited cash funds available. A detailed picture of even just one household's reciprocal relations is very difficult to sketch, however, as much reciprocity is hidden or only emerges at times of livelihood crisis (Ellis, 2000, p. 37). On Ukara, reciprocity provided a crucial means to survive during times of food shortages, and especially general reciprocity may also relieve social tensions and prevent differentiation through acting as a mechanism of redistribution of important resources. On the other hand, households can become

socially differentiated on the basis of their access to such networks, and as Offer (2012) notes, in some cases the reciprocal obligations can become a burden that may even accentuate poverty.

Ponte (2002, p. 153), however, remarks that in many areas of rural Tanzania the increased commercialisation of rural life has led to a more contractualised system of access to resources, which leaves less space for reciprocity in recruiting farm labour, for example. In my view Ponte's comment is definitely applicable to the commercial fishery on Ukara, and to booming commercial construction business on the island, as there is some kind of a boom to hire craftsmen from outside of Ukara to build new types of housing for the wealthier households on Ukara. But even in these cases, the workers are often recruited only after careful consideration of family or lineage relations and ethnicity. In agriculture, however, most transactions have traditionally taken place with no money involved. This is still true in most cases, but one reason for diversification even among the Kara households relying on farming relates to the imperative of having cash available for paying health centre fees, medicine, school fees, and new types of consumer durables sold by traders coming from outside of Ukara. Hence, the households must find sources of cash income in order to meet these new types of expenditure that cannot be paid by reciprocal, in-kind payments. Therefore it must be noted that reciprocity does explain all situations of exchange on Ukara, as markets for labour, household durables, livestock and foodstuffs have existed for a long time and are all rising in importance.

3.2.3 Household as the Basic Unit of Livelihood Construction

In the livelihoods approach is the accepted basic unit of analysis is the household, not an individual. Ellis (2000, p. 18) explains that "the view is not taken that individual action…can be interpreted separately from the social and residential space they inhabit." I agree with this opinion, as it suits my own study well overall, but there is a need to avoid over-simplification. A possible pitfall with this orientation is its tendency to undermine or blur the often diverging interests or strategies of the individual household members. A good example of this is the fact that in some case studies it has been noted that even though there is a tendency for households diversify their income portfolios, actually individual household members may be specialising in distinct full-time occupations more than before. This was also very much evident on Ukara. This has very

clear implications for labour allocation, as the larger households with more labour surplus tend to have an advantage over smaller households as far as diversification strategies are being concerned (De Haan et al., 2002).

In my analysis I try to be clear and honest about the extent to which this emphasis on the household may distort the understanding of the individuals' standing point. In addition to this, during my fieldwork I invested considerable effort in trying to establish the patterns of intra-household decision making, which proved to be an enlightening but also confusing process, as often different household members had differing views on how certain decisions are made. This may partly reflect the changing power relations within the local households, as especially young males signalled a growing frustration with the decision making power held by their elders.

The other possible pitfall relates to the question of how to define a household in a meaningful way. This is a very common topic of discussion within the field of development studies, but still one that I encountered during my fieldwork. Meillassoux (1981) defines a household as "a social group which resides in the same place, shares the same meals and makes joint or coordinated decisions over resource allocation and income pooling". In my opinion this view of the household is too restrictive and one that excludes members who are residing somewhere else. Especially on Ukara this is a crucial shortcoming, as in many cases both the household members residing in the homestead and the migrant member himself regard the latter as being an equal family member in spite of spending prolonged periods of time living in the fishing camps or working in a town on the mainland. Whether or not to include migrant members in the household headcount, may be problematic, as migrant situations differ widely. Schiff (2008), for instance, states that including migrants as household members tends to lead to misleading estimations of migration's impact on poverty levels. In practical terms, it also has to be noted that the way households make decisions over resource allocation and income pooling vary from one household to another. To some extent we can probably find this characteristic in most households, but some households are much looser units in their collective decision making than others.

The most widely accepted definition in the field of development studies is the one proposed by the United Nations (1998) which states that:

> The concept of household is based on the arrangements made by persons, individually or in groups, for providing themselves with food or other essentials for

> living. A household may be either (a) a one-person household, that is to say, a person who makes provision for his or her own food or other essentials for living without combining with any other person to form part of a multi-person household or (b) a multi-person household, that is to say, a group of two or more persons living together who make common provision for food or other essentials for living. The persons in the group may pool their incomes and may, to a greater or lesser extent, have a common budget; they may be related or unrelated persons or constitute a combination of persons both related and unrelated.

This definition has been accepted by many key players in development, among them e.g. OECD. From my point of view this definition is much more complicated but still more realistic than the one put forward by Meillassoux (1981). The most important difference is the use of the word 'may' in the UN definition, which indicates that there can be plenty of variation in income-pooling and budgeting among households. Also the fact that household members are not necessarily related to each other has been highlighted.

The idea of persons within the household 'aiming at providing themselves with food or other essentials for living' can be found accurate enough as far as the case of Ukara is concerned. My interviewees generally thought that household membership is dependent on using the same stove (*jiko*), which is parallel to the widely cited notion of 'eating from the common pot' (Beaman & Dillon, 2012). But not even this seemingly simple definition was clear enough in all cases, as some persons belonging to polygamous families did not agree with it. In most cases the two or more wives of the same husband had their own stoves and separate dining tables and meal times, but anyhow told that they are members of the same household. This situation, however, still adheres to the UN definition, in spite of the fact that some household surveys consider polygamous households as separate, in case the wives live in separate houses, cook separately and take decisions independently.[8]

Beaman and Dillon (2012) remark that it is particularly difficult to classify individuals into separate households in locations where extended families live in close proximity to each other. This is definitely the case on Ukara, where members of the same extended family inhabit certain areas of a village. Nonetheless, in qualitative enquiry the difficulty of defining a household is not as central for the reliability of the results as it is

[8] E.g. The Rapid Household Survey 2006 conducted by the Government of Mali (cited in: Beaman & Dillon, 2012)

when quantitative methods are being used. If the definition of a household is not clear in a sample of a quantitative household survey, the reported household listings may produce biased or even incorrect findings (ibid.).

Randall et al. (2011) have raised the issue of large-scale demographic surveys often using standardised definitions of the household, which are too inflexible to allow for any local conditions and variation in the understanding of the concept. They claim that this is a major shortcoming, which has led to distorted census results also in Tanzania. Randall et al. (ibid., p. 223) also argue that the Swahili term for a household, 'kaya', is a cultural invention of the 1970s, when the government forcefully put forward the use of Swahili as a national language over the more 120 ethnic community language in the country, and simultaneously exercised a villagisation project, *Ujamaa*. They state that kaya was an integral component of the ten-cell unit, which formed the foundation of the local administration in the Ujamaa villages. The ujamaa system was also practiced on Ukara, at least in Bwisya and Bukiko villages, but its impact has faded since the early 1980s. Randall et al. (ibid.) claim that the conflicting understandings between *kaya*, or the ujamaa household, and *familia*, family and *nyumba*, a house or a homestead, are at the core of making clear-cut definitions difficult in rural Tanzania. I came across this complexity during my fieldwork, and noticed that some people also used the concepts of *familia* and *ukoo*, meaning either lineage, extended family or clan, interchangeably.

Eric O. Ayisi (1992) has elaborated on this issue in stating that the difference between lineage and clan is that members of a lineage should be able to trace their common ancestor, whether dead or alive, and that members of any lineage should be able to be put on a genealogical chart. Contrary to this, members of a clan cannot trace a factual common ancestor, but may regard an imagined or mythical figure as their ancestor. Koponen (1988, p. 215-216) has noted that such view can be originally attributed to the classic definition of Radcliffe-Brown, but adds that the use of these terms by many later scholars has been extremely loose. During my fieldwork, I was not able to convincingly solve this issue, as it became evident that also the interviewees used these terms in differing ways. In this thesis, I will use the concepts of household ('kaya'), lineage ('ukoo') and ethnic group ('kabila') to avoid further confusion.

4 Methodology, Fieldwork and Material

4.1 Research Philosophy and Methodology

There is a need to briefly discuss my philosophical standpoint as a researcher prior to explaining the actual data collection methods that I have chosen to apply while on the field. Unlike researchers in the positivist tradition, I do not share their idea of the researcher being an objective observer who is independent from the realities that s/he is studying. Instead, I am inclined to agree more with the *postpositivist* conception of social realities being complex, multidimensional and, at least to some extent, socially constructed. While most postpositivist thinkers agree that reality does exist, this cannot be fully captured by social research, as it is inherently and unavoidably subjective and dependent on the researcher's theoretical presuppositions. In Reed's (2010, p. 23) words: "- - the relationship between researcher and object is 'influenced by', 'intervened in', or 'structured by' the social context of the investigator." Thus, scientific knowledge production should be rather understood as a formalised, continuously evolving conversation of accepted beliefs than as a series of accumulated 'facts' proved by objective scientists (Fischer, 1998).

Within the wider postpositivist research orientation, this study may be aptly posited within the paradigm of *critical realism*, as originally proposed by Roy Bhaskar (1975; 1979). In the Bhaskarian understanding of ontology, reality exists independently of human consciousness. Critical realists have highlighted the pre-existence of social structures, but underline that there is a constant dialogue between structures and agency. The structures are continuously transformed and reproduced by social actors. What follows is that epistemologically the role of social sciences is to try to uncover these underlying structures and causalities, even though only rarely this is actually accomplished. Nonetheless, due to the emancipatory nature of knowledge produced by social sciences, the greater understanding of the higher level structures should have positive consequences for humanity. Basically, social research should be able to give individuals ways to grasp the underlying mechanisms of their actions and help them to change these. Epistemologically, critical realists have challenged researchers within the positivist tradition by asserting that as social sciences are about relationships between humans, the fact of researchers being humans too will always influence the outcomes of their studies. For this reason, and the fact that human communities are essentially open system, finding causalities through experimentation within social sciences is impossible.

Yeung (1997) explains that the critical realist orientation is rather vague in terms of methodology or the selection of particular methods, but adds that *triangulation* through using multiple types of data sets is inherently suitable for research within this paradigm. This has been an important guideline for this study, as I believe that the use of quantitative data alongside with qualitative interviewing and participant observation may prove to be helpful. Triangulation was traditionally understood as the useful habit of trying to eliminate possible biases through comparing two or more different types of data sets, and thus providing a clearer understanding of reality. Orr and Mwale (2001, p. 1333) for example defended triangulation on the basis of double-checking the research participants' narratives of their social reality: "When households that claim to be getting poorer also report buying expensive consumer durables, there is clearly some madness in the method, or villagers' criteria differ fundamentally from those of the researchers." For a long time it was understood that through triangulation a researcher could conclude whether a phenomenon had been accurately measured, thus increasing the validity of the study. This idea has been widely altered into a more recent perception of triangulation as potentially revealing different dimensions of a phenomenon, and at best, providing the researcher with a richer understanding of the social world. (Moran-Ellis et al., 2006, p. 47–48) Triangulation, however, demands at least some level of paradigmatic pragmatism, as some of the more purist supporters of certain approaches feel that mixing methods is not philosophically viable.

Methodologically, rural poverty can be conceptualised and measured in a number of possible ways. For instance, it can be defined based on: a) monetary incomes at household level; b) the purchasing power of these incomes in terms of minimum caloric intake; c) assessments of household assets and other property; d) access to clean water, education and health facilities; e) the individual's control over his or her own income and time within age and gender relations; f) the type and allocation of household expenditures; and g) narrative descriptions regarding definitions and self-perceptions of poverty (Ponte, p. 140). It is evident that some of these 'indicators' of poverty have to be studied by quantitative, some others with qualitative methods. For myself, the main priority was the last one, as I was particularly interested in my informants' understanding of their personal situations. But I have decided to combine these narrative accounts with observations, governmental statistics and survey data collected by earlier researchers. As Bakker (1988, in: Brouwers, 1993) puts it: "Apart from qualitative data, an interpretive anthropologist needs to put his or her analysis within a framework of at

least some ‘hard’ data…” I will further explain the methods I have used in the following chapter.

4.2 Fieldwork and Methods Used

Prior to the fieldwork phase of my research I spent four months in Tanzania and Kenya in order to hone my Swahili language skills I had acquired in the language courses of University of Helsinki and at SOAS, University of London. I felt that this preparatory phase was invaluable for enhancing my communicational capabilities, as I did not want to be completely dependent on a translator. Britha Mikkelsen (1995, p. 108), like many others, has remarked that the language issue is one of the more urgent questions a fieldworker must answer. She notes that many aspects of human life *can* be observed without a fluent knowledge of the local language, but states that one of the gravest mistakes a researcher can do is to conduct interviews in a language the respondents do not fully understand. Another reason for the preparatory phase was bureaucratic, as I needed to have my application for an official research permit approved by the Tanzania Commission of Science and Technology (COSTECH). This process took approximately three months from beginning to conclusion, but proved to be worth the wait as several government officials asked to see my permit in during the fieldwork phase.

The actual fieldwork was conducted in Mwanza Region in January and February, 2013. I spent five weeks on Ukara Island and two weeks combined on Ukerewe Island and in the city of Mwanza. Ukara is part of Ukerewe district, which extends over an area of 6400 km² and is divided into four divisions, 24 administrative wards and 74 villages (Mwanga et al. 2013, p. 400). In my opinion, this was a compromised but sufficient length for my stay on the field, as I was able to gain an understanding of the local setting and - to some extent - build trust among my research subjects. In the following chapters I will give a detailed description of my being on the ‘field’, the methods I chose to apply, and the possible biases that may occur when a Western researcher is collecting data in African villages.

4.2.1 Conducting Research for a Case Study

It is a common misunderstanding to think that a case study is a 'method' in itself (Laine et al. 2007, p. 9). Instead, it is rather a research strategy or orientation, which calls for the utilisation of a variety of methods. My aim on Ukara was to systematically gather empirical, mainly qualitative but also quantitative, data about the current social setting in order to understand how the local people live and pursue their respective livelihood strategies in this social and ecological context. Robert Yin (2003, p. 13) agrees with this idea of a case study research implicitly involving multiple data sets. He has further defined case study research as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident." (ibid.) For myself as a researcher, this strong link to the actual social realities is the most intriguing about conducting case study. While the case study method does not inevitably call for fieldwork, it has definitely been a useful and powerful learning experience to share thoughts with the people who live in the context I am studying. Being and living with my informants – albeit briefly – has given me much more nuanced and deeper understanding of the conditions where they live their lives.

The crucial, preliminary question in any type of case study is about why is this particular case a case (Laine et al. 2007, p. 10). I have explained earlier that I regard Ukara as an interesting case study due to its peculiar system of intensive, cereal-based agriculture combined with high population densities over the past centuries. In this sense Ukara is atypical case when compared to almost any other location in rural Africa. Against this background, it can be highly illuminating try to understand how such a remote locality has in a few decades time had a substantial increase in the numbers of human population and whether this trend has been socially and ecologically sustainable. In this regard, the case of Ukara, if deeply studied and understood, may act as a paradigm for sustainable resource use through small-scale, low external input agriculture (Stump, 2010, p. 1252). From my perspective, understanding the situation on Ukara is valuable in itself, but ideally this could have benefits for the wider study of similar 'islands of intensive agriculture' and for debates about population pressure in rural settings in general. While generalising from single case studies must be done with

caution, it seems that the case of Ukara may also be used as a critique of the influential Malthusian theory of population growth. I will discuss this in more detail in chapter 5.3.

Berg (2004, p. 256-258) has presented the typology of case studies, and proposes that the three common approaches are *exploratory*, *explanatory* and *descriptive*. I understand this study as being exploratory in the sense that I had to begin my fieldwork with the aim of establishing what actually is happening on Ukara and what are the big trends affecting the research setting at the moment. Therefore I was only able to polish my research questions during the fieldwork period and decide on the suitable theoretical framework only afterwards. However, I feel that towards the end of my field period, the study became also *explanatory*, because I had chosen the focus of my research and was able to rethink my observations through the many propositions suggested in relevant literature.

There has been vast literature on the strengths and weaknesses of the case study as a research strategy, the key topics relating especially to the *objectivity* and *generalizability* of the findings of such study. There is not enough space to discuss these debates in much detail here, but I will briefly clarify my personal view. Firstly, I assume the position that qualitative enquiry can never be entirely objective. I will also present some possible biases that can affect the data-gathering below. However, parallel to Yin (2003, p. 58), I feel that the researcher should try to be as unbiased by preconceived notions as possible, and also be responsive to contradictory evidence. The researcher must also try to be open in scrutinising the potentially relevant biases. Secondly, regarding the question of generalizability, some scholars, especially with a constructivist orientation (e.g. Guba & Lincoln, 1989, pp. 94-95, 241-242) claim that generalizing is a fruitless endeavour, because social life is always time- and context-bound. Nonetheless, some others (e.g. Peuhkuri 2004, p. 133-134; Yin, 2013) argue that well-designed case studies allow room for analytical generalization. Bent Flyvbjerg (2006) agrees with the latter in reiterating that generalizing from a single case is indeed possible, but adds that "…formal generalization is overvalued as a source of scientific development, whereas 'the force of example' is underestimated." He is also very positive of the idea that through being able to produce deep and detailed knowledge case studies can be very useful in testing different hypotheses or propositions - or through falsifying these through identifying 'black swans' in the Popperian tradition.

The process of falsification, as formulated by Karl Popper, a famous developer of postpositivist thinking, is one of the most rigorous tests for a scientific proposition, as if just one observation does not fit the proposition, it cannot be held as being valid generally. (Ibid., p. 227-228). In my view, the case of Ukara can definitely serve as a powerful example that can be compared with other locations of intensive agriculture. On the other hand, it might also be understood as another falsification of the Malthusian theory, as Ukara clearly demonstrates that there are several ways to overcome or at least delay the checks on population growth. Interestingly, this has not been achieved by adopting more advanced agricultural technologies. Instead, the essential nature of the agricultural system on Ukara has altered from a historically atypical case of a *grain-based* system with high population densities to a much more common case of a *tuber-based* system with even higher population densities.

4.2.2 Methods Used on the 'Field'

In total, I spent seven weeks doing fieldwork in Mwanza, Ukerewe and Ukara. In addition to this, I spent two days collecting official statistics and census data at The National Bureau of Statistics in Dar es Salaam. The majority of this time – five weeks in total – was naturally spent on Ukara, where I initially engaged in participant observation. In practical terms, this consisted of wandering around by foot or by bicycle, talking to people, socialising and participating in their daily activities. I write detailed field notes of my observations. This part of my data collection can be described as *focussed observation*, what implies that I put greater emphasis on trying to observe those aspects of everyday life that had arisen as particularly important during the interviews that I had completed in Mwanza and Ukerewe with local government officials and researchers (Werner & Schoephle, 1987, in: Kawulich, 2007, p. 11). On Ukara I had a research assistant with me for two weeks, and during this period I managed to complete 49 thematic interviews with members of households and some local-level officials. The aim of these interviews was to understand the composition of local livelihoods and the main challenges related to making a living. I also put a lot of effort in trying to grasp how life on Ukara has changed in the long term and how people think that population growth is affecting their environment.

I did not aim at constructing a complete description of social life on Ukara in my notes, as I found this impossible regarding the time limitations and unnecessary for answering my research questions. Instead, through writing detailed field notes I tried to gain as much data as possible relevant for understanding how the local households are making a living and trying to improve the quality of their members' lives. I was mainly moving around by feet or by bicycle, often for several hours a day. This was often exhausting due to the heat, but I found it invaluable to use the same methods of transportation as the local people, as this gave me much better opportunities to make observations and talk to strike up acquaintances. By carrying a GPS device with me while moving around, I was also able to measure distances from one village to another. This was valuable for understanding how far people travel for firewood, wells or schools.

My fieldwork was mainly focused on the largest and busiest village of Bwisya and the calmer and more distant Bukiko, but I had enough time to visit all the villages several times. I also conducted some interviews in the fishing-oriented villages of Chibasi and Chifule, both located in Bukungu ward. My entrance to the field was greatly facilitated by my research assistant Deus Naluyaga connecting me with Josefu Mkundi, the chairman of the Ukerewe District Council. Mr Mkundi kindly accommodated me for almost a week at his family home in the village of Bukiko, and he also helped me to contact and meet all the relevant governmental officials and many local families on Ukara. This adheres directly to a piece of advice by Bernard (1994, in: Kawulich, 2005, p. 14-15) who states that a researcher should always begin with meeting the community's leaders or other possible gatekeepers in order to guarantee an uncomplicated entry to the field site.

Being in close rapport with the local authorities naturally includes another type of risk, relating to the fact that sometimes a close acquaintance with local authorities may lead to the researcher being connected to them, at least in the community's eyes (Chambers 2005, p. 36). This was a particular problem during the colonial era in many African countries (Heyer, 1993, p. 207), but could potentially have put my own credibility into question as political competition in the Ukerewe District is currently rather tense, and my host was the elected representative of the Chadema party[9]. After the first week I

[9] Chadema, short for Chama cha Demokrasia na Maendeleo, is at the present time the main opposition party to the ruling party CCM (Chama cha Mapinduzi). Mwanza Region is one of Chadema's stronghold areas in the country.

switched my site of accommodation to a guest house in Bwisya village, partly for this concern, but more importantly for the more convenient connections to other parts of the island.

Eventually I concluded my fieldwork with a written, qualitative questionnaire that was answered to by the local secondary school students (n=87). Through this questionnaire I was able to collect further data that might provide a basis for triangulation and gain some new insights on the local household composition. The questionnaire included 19 open-ended questions, which are given in Appendix 2. The respondents were Form 4 students of Bwisya Secondary School, the only secondary school on Ukara. The respondents' are aged between 13 and 23 years, the median age being 18. In terms of their ethnic background, 62% (n=54) are Kara, 18% (n=16) Kerewe, 15% (n=13) Jita, 3% (n=3) Sukuma and 1% (n=1) Luo. Of all respondents, 69% were born on Ukara (n=60), 21% on Ukerewe (n=18) and 10% elsewhere in Tanzania, mainly somewhere in Mwanza or Mara Region. Curiously, as many as 59% (n=51) of respondents are female, while 41% (n=36) are male.

I chose to conduct the survey with secondary school students, mainly because they were easy to reach and able to respond accurately in writing, unlike many of my other interviewees. It must be noted that these respondents are unlikely to belong to the poorest households, as those are seldom able to pay for their children's education up to the last grade of secondary school. In Tanzania, primary education is free[10], but public secondary schools cost approximately 40 000 TSH per year[11]. On the other hand, the wealthiest Kara prefer to send their offspring to study outside of Ukara, as the only secondary school on the island is considered as a poor option due to its very limited resources. The procedure of conducting the survey was surprisingly uncomplicated, as having had the acceptance to use the survey form I had designed from my thesis instructor via e-mail, I translated the questions into Swahili with the local English teacher. Eventually Bwisya Secondary School's head teacher granted me the permission to conduct the survey after showing him the survey form and explaining the purposes of my research. When the respondents were all gathered in one classroom for filling the form, I made clear the reasons for needing such data and elucidated the premises of

[10] In spite of public primary schools being free, pupils must have school uniforms and pay a small, but often significant fee for stationery.
[11] The equivalent of approximately 25 USD in January, 2013.

confidentiality and anonymity. The respondents took some 45 to 75 minutes to answer all the questions, during which time their teacher and myself were present in the room helping out with explaining anything that was unclear. Having returned back to Finland, I translated the responses from Swahili to English a process that took plenty of work time.

In the questionnaire, I inquired the respondents' basic information including name, age, sex, ethnicity and place of birth. I also inquired where they are living now and when have they moved there. Other questions were related to household composition, main household activities, division of labour within household, numbers of cattle and other animals, acreage of cultivable land and whether the household has faced hunger, possible migrant members and remittances, and the ways to collect money to pay school fees. The final two questions were about other possible troubles related to life and the respondent's plans for life after finishing secondary school. All the respondents were explained orally why I was conducting research and how their responses will be used. I promised not to use any names in presenting the study, but names were collected because I wanted to have the opportunity ask the respondents further questions in another interview session. I decided to conduct one interview with one female student, who was able to clarify on some issues, especially relating to girls' challenges in education. While I was generally satisfied with the accuracy of the questionnaire responses, I believe that many respondents had somehow misunderstood question number 14: "Does your household use hired labourers in cultivation? If yes, for which field activities mainly and what time of the year?" Most responses to this question were rather obscure and I decided to omit the whole question from my analysis. In addition to this, the most respondents were also unable to clearly state the acreage of their household's landholdings. This was a problem also in my interviews and which I believe is related to the highly fragmented nature of fields in any household's possession. Seven respondents also misunderstood the concept of household ('kaya'), and issue that I have discussed in chapter 3.2.3. Overall, conducting the questionnaire was highly beneficial in giving an overview of some issues related to household composition and livelihoods, but still I have prioritised the data derived from qualitative interviews. This is due to the fact that with the help of my skilful research assistant, I was able to clarify on any possible misunderstandings between the informants and

myself. In the following chapter I will further elaborate on how the qualitative interviews were conducted.

4.2.3 Qualitative Interviewing in Practice

I completed 49 thematic interviews with members of local families, local government officials, teachers and some traders or fishermen who were only visiting Ukara or lived there semi-permanently. The final number of formal interviews was higher than I originally planned to conduct, mainly because I had prepared my timetable so that it would allow for unexpected inconveniences. Fortunately finding willing informants through a type of 'snowballing' procedure proved to be a much smoother process than I had expected, and during the two weeks I was able to work with a research assistant, I managed to organise on average almost three interviews per day. Initially, I targeted the local government officials in order to gain an easier access to the communities and frame my enquiry on the basis of their expert knowledge of recent developments on the island. As I progressed with my work, I was able to find interviewees within local households belonging to different spheres of the local communities.

Instead, as adviced by Guyer and Lambin (1993), I started from 'privileged witnesses' who were selected mainly for their position in the social group or for their field of expertise, and less for representativity. I felt that it was highly valuable to make contact with the local leaders and government officials in order to gain a particular view of the pressing issues on Ukara. This was also necessary for being able to work on the island, where the local people were not at all accustomed to having a European observer living and conducting research among them. In addition to this, some officials that I consulted in Mwanza acknowledged that they had become cautious towards foreign researchers since the Austrian documentary filmmaker Hubert Sauper released his controversial film *Darwin's Nightmare* in 2004 depicting the miserable side of fishing business in Mwanza. From my viewpoint it is clear that establishing contact the local authorities and presenting the needed permits and the aims of my research were of key importance for me being able to complete the fieldwork phase without any distractions.

Interview participants		**No. of interviews**
Sex	Male	39
	Female	10
	Total	***49***
Main occupation	Farmer	8
	Farmer and other	7
	Fisherman	3
	Boat owner	1
	Teacher	2
	Student	2
	Salesman	2
	Restaurant/bar	2
	Political leader	2
	Government official	8
	Researcher	2
	Retired	6
	Other	4
Age group	20 or under	3
	21-30	11
	31-40	10
	41-50	14
	51 or over	11
Ethnicity	Kara	28
	Kerewe	8
	Other/not given	13

Table 1: Overview of interview participants

The list of interview participants is given above, with details of their sex, main occupation, age group and ethnicity. Majority of the interviewees were men, partly due to the fact that being a male researcher, I noticed that negotiating access to male participants was much less complicated than to females. Generally speaking, men also participate much more in the wider community, for which reason they were in most cases rather well informed on the current trends of life on Ukara, unlike many women who must bear responsibility of an excessive workload within their households.

I tried to cover a wide range of opinions related to my research questions, and for this reason I made a deliberate attempt to interview people representing many different age groups, occupations and ethnicities living on Ukara. It has to be noted that some of the interviews were conducted on Ukerewe Island and in the city of Mwanza. When asked about their ethnic background, 28 of the interviewees identified themselves as being Kara, 8 were Kerewe and 13 belonged to other ethnic groups or did not want to answer

or were not asked this question. The interview sample is admittedly not representative of the overall population on Ukara, where the vast majority of inhabitants are ethnically Kara and mainly derive subsistence from cultivation. On the other hand, I could not have understood the current social situation on the island without asking persons belonging to different groups.

As far as the occupational statuses of the interviewees are considered, 15 of them classified themselves as farmers, but out of these 7 people stated that they are also engaged in other important activities, mainly in the fishing of the silver cyprinid. Nonetheless, all the retired participants (n=6) had been farmers and some of them still occasionally participated in the farming activities. Hence, the number of interviewed farmers was actually as many as 21. The list above gives a good overview of the different occupations and age groups of the participants. There were some interviewees who did not mention their exact birth year, in which case I decided to make a rough approximation of their age by myself. I admit that this was in some cases difficult, and not all estimates probably hold truth. The occupational categories are also somewhat artificial, as many interviewees were involved in a diverse set of occupations, but nonetheless, the main activity they associated with is given here.

My main technique for finding interviewees could be called ‘snowballing’ procedure, as I tended to ask my informants to introduce me to other people they would like me to meet. Many of them cherished the opportunity to show a stranger around, and this is how I made some very interesting contacts. Another of my preferred techniques was to just wander around talking to people, which often led to some of them inviting me to their homes. It is possible that these procedures leave space for a bias towards the more accessible people in the community, but some of the interviews conducted in the more distant areas of Ukara and with people who do not participate much in the daily village life, among them persons with physical disabilities. Generally speaking, it was not difficult at all to find people who were willing to answer my questions, but in many cases the pre-scheduled meetings did not hold - probably due to many reasons, including the unpredictability of the daily programme and the not-too-rigid local conception of time.

The interviews themselves were also rather easy to conduct, particularly thanks to my research assistant's good knowledge of the local customs and his language skills. I owe him a lot for being patient in communicating the many concepts that were not immediately mutually comprehensible between the interviewees and myself. I sometimes found the aspects of the local method of farming difficult to understand, whereas for the interviewees those were of course self-evident. For my part, I always tried to modify my questions so that the informants were able to grasp the matter as easily as possible; and when someone did not seem to have anything to say on a particular subject, I was quick to react and change the course of the discussion. I feel that this flexibility was of great help in making the interview situation interesting and rewarding for all parties. As Eskola and Vastamäki (2001, pp. 26-27) point out, the participants tend to be motivated when they are able to discuss their own experiences that are important to themselves. I noticed that such topics were always most useful for enquiry, too. What this meant in practice, was that fishermen were able to teach me issues relating to fishing, whereas adult women were highly specialised in issues related to the homestead. Often I found it interesting that men and women tended to possess very different type of information. Men were better informed of issues related to the wider spheres of communal life on Ukara, whereas women were better aware of some aspects of daily life at the household-level.

The interviews were either conducted at the respondents' homes or at their workplaces. The most common setting for an interview was at the front yard of the interviewee's house, usually sitting on small, wooden folding chairs, in the shade of a big tree. I felt that the respondents were more relaxed in their personal environments, and it was also valuable for me to see how the people lived. The interviews were not recorded, as I noticed that most local people were not comfortable with my pocket-size recorder. Instead, I preferred the more traditional method of writing down the interviews with pen and paper. I am not a great hand writer, but I had enough time to write things down accurately because the translation process slowed the speed of the discussion down. Another factor easing my work was the calm, even lingering, method of communication among the Kara. My respondents often mentioned that, in contrast to how they viewed people coming from elsewhere in Tanzania, on Ukara and Ukerewe islands the desirable way of speaking is tranquil, and rarely getting loud even amidst an argument. The normal duration for an interview was 60 to 90 minutes, but in some cases I decided to

settle for less, if I noticed that the respondent was anxious or burdened with other responsibilities.

I tended to begin the interview with some informal chatting in Swahili, sometimes using the few phrases of Kara I had acquired, in order to make the situation as comfortable as possible. My research assistant and key informant Deus Naluyaga was particularly skilful at this craft, and he commonly went through his and the respondents family background to see if they have any common friends or even relatives. In the more formal parts of the interviews, I mainly focussed on gathering narrative descriptions of the development of the local livelihoods. In some interviews, particularly with older people, I utilised a type of life history interviewing, which allowed me to gain a perspective to the changes that had occurred in the long term. Naturally, these narrations are very much prone to subjectivity and sometimes tell more about the individual person's health and employment situation than reveal a general pattern touching upon all households on the island. Nonetheless, I felt that there were some larger trends (such as changes related to governance, spread of religion, availability of services, employment opportunities etc.) that inform us about the dynamic qualities of life, culture and economics on this seemingly isolated island.

4.2.4 Analysis of the Qualitative Data

Having returned back home to Finland, I retyped all my handwritten field notes and interview data on the computer. Following this, I imported all the typed material to Atlas.ti software, which is designed for the analysis of qualitative data. Subsequently, I coded the whole data set with hermeneutical tags that I found to be most useful for restructuring the data. During the process I discarded some of the less important codes, but finished with the following:

	Code	No. of quotations
1	Agriculture and cultivation	111
2	Education	101
3	Fishing and related activities	100
4	Out-migration and remittances	99
5	Family relations	90
6	Land ownership	82
7	Price level / wages	75
8	In-migration	65
9	Religious beliefs	52
10	Petty trade and business	51
11	Livelihood diversification	50
12	Infrastructure (incl. electricity and transportation)	47
13	Historical change on Ukara	45
14	Occupation / work	45
15	Population growth	44
16	Gender roles and relations	40
17	Livestock/cattle	39
18	Community, clan and lineage	37
19	Local governance and politics	37
20	Giving birth / raising children	35
21	Food deficit / hunger / famine	34
22	Marriage	32
23	Health care and health information	30
24	Natural environment / geography	27
25	Social differentiation	25
26	Housing	23
27	Forced resettlement (to Sengerema)	21
28	Inheritance	19
29	Water and sanitation	15

Table 2: Codes applied during restructuring the interview data (Atlas.TI)

The table of the codes applied during the restructuring process is helpful in giving a quick overview of the topics covered during the interviews. What can be seen is that while I wanted to focus my inquiry mainly on issues related to livelihoods and especially on the activities that the local people rely on for their subsistence and income-generation, my informants were constantly highlighting some other subject matters, too. For instance, the role of education and religious beliefs were mentioned in most interviews. These occurred to me as important aspects of the main theme, as it

became apparent that many interviewees saw education as the most viable way out of poverty – and out of their current livelihood activities. Similarly, the role of religion and worship was often, but not always, viewed as a potential aid in the search for better life. Thus, I did not feel any need to restrict my interviewees' speech on any of the coded topics, as I do find all of them relevant for the holistic study of livelihoods.

Following the coding of the data, I opted not to use the more advanced possibilities for data analysis offered by the software, as I did not regard it as necessary. Instead, I printed out all the quotations under each topic and continued to work with the traditional pen and paper method. As far as the surveys responded by the local secondary school pupils are concerned, I decided to translate all the answers into an Excel file in order to make them easily readable. During analysing and interpreting all the data, I put relatively more emphasis on the interviews than on the surveys, because I regarded the interview data as more reliable. This is due to the fact that in case of any misunderstandings, I was always able to double-check the oral information with my research assistant.

4.2.5 The Question of Possible Biases

My main research interest has been to find out how the people on Ukara perceive their own living conditions, and how do they view their own actions in relation to the challenges and opportunities posed by the changing natural and economic environment. Therefore I have opted for qualitative enquiry, supported by all relevant quantitative data that I have been able to access through both earlier academic research and the statistics collected by local, regional and national bureaucracies. In addition to these, I asked the local secondary school students to fill in a questionnaire, in order for me to gain further evidence for establishing my argument. Soon I came to realise that relying solely on just one method, would have given me a different view of the overall situation, as far as livelihoods on Ukara are concerned. Hence, I am inclined suggest that the methods I chose to apply, have allowed for at least some degree of triangulation, which has proved to be valuable for the outcome of my study.

Even so, possible biases remain. Robert Chambers (2008, pp. 31-38) has listed six common biases affecting a brief fieldwork period. *Spatial bias* refers to the tendency of researchers to conduct interviews in the households that are easily accessible. I

addressed this bias by selecting a fieldwork site, Ukara Island, which is a remote location, at least relatively speaking. On the island I chose to visit all the villages and many households who were living far from where I was accommodating. The relatively small size of the island naturally helped in tackling this issue. The second in Chambers' list is the *project-related bias*, which means that researchers tend to work in areas, where western NGOs have implemented development-related activities. This might pose a problem through affecting the level of independence enjoyed by the researcher. Also, according to Chambers, locations with development activities are not among the least privileged. On Ukara this bias was easy to avoid, as the only development intervention by an NGO was a small-scale project by Helen Keller Foundation, supporting the growing of fruit and vegetables on the island.

The third one is the *person-related bias*, which indicates a possible partiality of interpretation relating to the researcher's personal identity. In my opinion, this was probably the most difficult bias to evade, due to the fact that as a European young man there my presence was certainly a source of fascination for some, but of puzzlement for others. In a few weeks it was admittedly impossible to 'normalize' my living among the Kara, despite building a good level of trust with some individuals. The fourth is the *seasonal bias*, which refers to the idea that the local modes of living, including food availability and consumption, may vary significantly depending on the time of the year. It was important to be aware of this pitfall, and I attempted to deal with it by asking, how different aspects of life customarily vary over the course of the year. I soon realised that it extremely difficult to get an accurate overview of these changes, but at least I was aware of this possible bias throughout the process.

The fifth one is the *diplomatic bias*, which relates to the local people being extremely polite toward the researcher and vice versa. This bias may manifest itself as families offering food that is normally available during festivities, or the researcher being too polite for asking questions that might be considered inappropriate by the informants. I experienced both sides of the issue, as I was being served duck and goat meat, even though it was clear that the more common dish consisted of cassava ugali and some type of fish. Out of politeness (and due to a level of frustration) I also decided not to ask direct questions relating to amounts of remittance money the household is receiving, as many interviewees seemingly considered this as insulting. Another side of the diplomatic bias is that the informants may lie, exaggerate or distort their accounts. Some

people might not dare to tell the truth, while some do not want to, possibly out politeness. From my perspective, the best ways to try to address this problem are triangulation and the treatment of interview data as personal accounts, not as some ultimate truths. The sixth is the *professional bias*, which concerns the fact that researchers specialising in water engineering may place a disproportional focus on local solutions relating to water supply, leaving other equally important factors aside.

Another, particularly rigorous, analysis of possible biases affecting qualitative research has been made by Onwuegbuzie and Leech (2007). Their listing is rather exhaustive, but I will discuss here some of the more important issues mentioned by them. Firstly, *observational bias* may arise if the data collector obtains an insufficient amount of behaviours or words from his/her informants. I aimed to tackle this issue by spending five weeks on the field site and collecting a rather vast number of interviews. Secondly, *corfirmation bias* means that the researcher has a tendency to let his hypotheses to blind him from accepting competing explanations. I was very much aware of this potential problem prior to my fieldwork and tried to avoid it by refusing to apply a strict theoretical framework a priori. The big theme of livelihood diversification only arose during the fieldwork and while analysing the data. Thirdly, these authors mention *researcher bias* which means that the researcher lets his/her a priori assumptions to affect data collection or interpretation. (ibid., pp. 235-237) In my view, this is one of the most difficult concerns to address, as there is no avoiding the fact that my own understanding of the context will frame my inquiry in many ways. I have responded to this challenge by intentionally trying to avoid leading or pushing the informants to certain explanations during my interviews. This issue of researcher bias and reflexivity is discussed in more detail below, with a reference to Kirsti Malterud's (2001) insightful work.

I prepared myself with a clear awareness of the multitude of factors that might be relevant for local livelihoods, allowed people to explain issues from their own perspectives, and tried to view the more important issues from several angles. Undisputedly one's ability to evaluate different social circumstances is unconsciously influenced by a level of ethnocentrism and affected by one's earlier experiences and innate value systems. As Malterud (2001, p. 483–484) explains, there is no escaping the fact that any research is *reflexive* in the sense that a researcher's background and position affects the topics they choose to investigate, the angle they opt to take, the

methods they regard as suitable, and the way they frame and communicate their findings and conclusions. This is evident also in laboratory settings where researchers can try to reduce biases through controlled experimental investigations, but in real-life situations these issues become even more accentuated. A field research has to accept that at the end of the day there is no such thing as a neutral observer, but instead all research is at least to some extent formed by a human touch. In Gerring's (2004, p. 351) words:" What one finds is contingent upon what one looks for, and what one looks for is to some extent contingent upon what one expects to find."

4.2.6 Some Ethical Considerations

In any type of research, the ethical viewpoints are of vital importance, but these are even further accentuated if we consider ethnographic fieldwork as the researcher is often expected to be involved in the research participants' lives. In the Tanzanian context, any field researcher should obtain a formal permission to conduct research in a particular setting, which might potentially lead to researchers abstaining from choosing politically insensitive topics for their studies. Regarding my own study, however, this was not a major issue. Prior to beginning my fieldwork, I applied for a research permit from the Tanzania Commission for Science and Technology (COSTECH) in September 2012 and received the permit in the following December. Upon my arrival to the actual site of the fieldwork, I sought permission to conduct this study by Ukerewe District Council's chairperson on Ukerewe and Bwisya Ward Executive Officer on Ukara Island. I also met with other local leaders who were all positive towards my research, although some were slightly concerned of my personal safety as there had been a series of violent robberies in Bwisya village only recently. One local government official were also worried that the local farmers might not be willing to be interviewed by a European researcher, but eventually I had no problems with neither of these issues.

I will not discuss here the more basic, even self-evident, ethical imperatives relating to the honest reporting of the study, such as plagiarisation, appropriate use of research grants and so on. Instead, I will examine some of the practical matters and ethical dilemmas that I encountered during my fieldwork. When doing research among human beings, the first obligation is to demonstrate proper respect for their basic rights and their moral dignity (Besnik, 1998, p. 68). In addition to this, the informants should be

only included in the research if they give their voluntary, informed consent (ibid., p. 133). During my fieldwork, I began each interview with a careful elaboration of what my study is about, for what reasons I wanted to hear my interviewees opinions, and how I was going use this information. To most of my informants, the whole idea of a person arriving into a new cultural setting on the other side of the world in order to merely listen to people and to learn what their lives are about seemed puzzling. Each time I asked my research assistant to make sure that the interviewees fully understood, what we are about to do, and to give their oral consent for us to proceed with the enquiry. Basically, the ideal would be to ask consent from all individuals observed or informally spoken to, but as Fabian and de Rooij (2008, p. 624) point out, there is sometimes a need to make compromises, because it may be impossible to get informed consent from everyone.

As a rule, the researcher should also protect the privacy and confidentiality of research subjects (ibid., p. 134). I promised all my informants that their names would be anonymised. The exceptions to this rule were my three key informants. The first one was Deus Naluyaga, a college graduate who originates from Ukerewe, who also acted as my research assistant. The second was Josefu Mkundi, the chairperson of the Ukerewe District Council, who originates from and lives in Bukiko village, Ukara. He was also my host during the first week I spent on the island, and he helped me to gain access to the local government officials. The third was Paschal Phares, a secondary school graduate and farmer from Ukerewe, who took plenty of time to show me around and explain the nuances relating to the differences in cultivation methods of the Kerewe and the Kara. These three men were extremely hospitable and assisted my being on the ‘field’ in many ways. All other informants have been anonymised to guarantee that they will not have negative consequences for participating in the study. Scheyvens et al. (2003, p. 146) remark that even when some informants would like to have their names publicised, it is up to the researcher to deliberate, whether they might be in the risk of facing such consequences, and anonymise the material if in any doubt. On the other hand, Fabian and de Rooij (2008, p. 624) argue that anonymisation should be avoided as it may decontextualise and objectify research materials or deny the informants’ contributions as well as their status as historical actors. I fully understand this opinion, but have chosen to use pseudonyms as I want to be careful not to cause any harm to the participants. In the text body, I refer to my research participants with the letter P and to

the questionnaire respondents with the letter R. This is followed by an individual code number given to each participant/respondent.

Another important ethical consideration relates to the way the researcher can give rewards to the informants. I think it is important to briefly elaborate here on my solutions to this question in practical terms. Some of the interviewees asked for a financial contribution, but already before starting the interview I explained that this is not appropriate. Devereux and Hoddinott (1993, pp. 20-21) have suggested researchers to avoid paying the interviewees for two reasons. Firstly, handing out payments might distort and 'instrumentalise' the relationship between the researcher and the participants. Secondly, this might also make future research in the same location difficult, as the people may not be willing to participate without being paid. While living in Tanzania I noticed that this is a common problem in some areas of the country, but not so much in Ukara, where few researchers have worked for longer periods. None of my potential informants withdrew from the research in spite of not getting cash for participating.

In spite of this, I felt that some other types of small gifts might be appropriate, but due to the very limited budget available for my fieldwork, I needed to think carefully what these could be. My preferred method here was to support their daily income-generating activities through buying some foodstuffs like fruit or roasted nuts that many families were selling, or opting to use some other services such as motor bike rides or bicycle repairs that they were offering. But the most appreciated gift was that I took photographs of the families I interviewed, sent the photos to be developed in Mwanza, and returned them to the families when I was bidding farewell. Most people had never had their photo taken before, so these were highly esteemed presents. Ken Wilson (1993, p. 189) has advised researchers to make some kind of contribution at the end of their fieldwork phase, and make it one that benefits the wider community, not just some high-ranked individuals. This was something I aimed to do, admittedly in a rather modest way, when giving a football to the Bwisya Secondary School to be used at their PE lessons. I also gave ballpoint pens to the pupils who had responded to my survey. Hiring a research assistant is naturally a wholly different issue, and I paid him a daily wage for the work he did for the research.

5 Ukara, its People and the Changing Population Levels

5.1 General Characteristics of Ukara Island

Ukara is an island located in the south-eastern part of Lake Victoria, Tanzania. Relevant maps of Tanzania and Ukerewe District respective can be found in Appendices 2 and 3. The island covers an area of 80 km^2 and has a population of 37 182 inhabitants (National Bureau of Statistics 2013). The population density is currently at 463 inhabitants per square kilometre. Geographically Ukara is surprisingly diverse consisting of sandy soils, hilly grasslands, areas with loamy red earth, vast valleys and characteristically impressive rock boulder formations that dominate the landscape especially on the eastern side of island. On average, the island is at 1100 to 1300 metres above sea level. The highest peak is Busere Hill, 1297 metres, on the eastern part of the island.

The main ethno-linguistic group on the island is called the Kara (*wakara*) who mainly speak Kara, their native ethnic community language, which was spoken by approximately 86 000 people in year 1987. Most of its speakers were located along the southern shores of Lake Victoria, especially on the stretch between the two major towns of Mwanza and Musoma. Kara is a typical Bantu language and is closely related to Jita and Kwaya, which are mainly spoken on the eastern shores of the lake. (Ethnologue 2011.) The large numbers of Kara speakers outside of Ukara is a piece of compelling evidence of the high levels of out-migration the island has experienced throughout the 20th century and even today. Especially since the 1980s there has been a remarkable influx of in-migration of people belonging to different ethnic groups, among them at least Kerewe, Jita, Sukuma, Kwaya, Kuria and Haya. Hence, it is important to note that the island is no more mono-ethnic, in spite of barriers to land ownership being still a major obstacle for the non-Kara farmers in settling to Ukara.

Being part of Ukerewe District, Ukara forms its own division which is divided to four separate wards of Bwisya in the southern, Bukungu in the western, Nyamanga in the northern and Bukiko in the eastern part of the island. Each ward consists of two villages, which have their own respective Village Executive Committees. Map of Ukara can be found in Appendix 4, but it dates back to year 1976 and contains some errors especially in relation to the number of huts, marked with tiny black dots. The number of huts or houses has risen remarkably since the 1970s.

5.2 History and Origins of the Kara

The historical origins of the Kara are not entirely clear. Former colonial officer Paterson (1956, p. 54) writes that the inhabitants of the island have originally belonged to several different ethnic groups around Lake Victoria. According to his perception, the island's original inhabitants were first joined by settlers from the Kavirondo Gulf, who were later joined by other arrivals from Musoma, Sukumaland, Ukerewe and Bukoba. The last of these major groups would have moved in at around year 1570, during the reign of Chief Ruhinda in Bukoba, located on the western coast of the Lake. It is difficult to verify this narrative as it appears to be based on oral genealogies, but having touched upon this issue during my interviews with some local elders, it seems to commonly accepted. According to Paterson (ibid.) the early settlers settled in Bukiko village, where the members of the two major lineages - the Mkundi and Mataba - claimed to have ancestral roots in Musoma and Bukiko respectively (P8, P40).

In any case, over the years all of these newcomers adopted a Kara identity and developed a distinct culture, which has some significant differences as compared to the neighbouring Ukerewe Island, inhabited by the Kerewe. The most important deviations have been found in the local forms of governance and the agricultural methods. These differences are probably due to the relative isolation of Ukara during the pre-colonial and colonial times, particularly during the reign of Ukara's Chief Mataba, who favoured a policy of not letting foreigners to stay on the island. Paterson (1956, p. 55) explains that Mataba's father Matete was elected as the ruler and spokesman of Ukara in year 1900, following an election set up by an armed party of German colonialists. Prior to this time, there had been no centralised chiefdom on Ukara, contrary to the highly stratified social hierarchy on Ukerewe based on semi-divine monarchy (Hartwig 1968, p. 111-113, 142; Chacker 1968, p. 75).

Chief Mataba was the immensely influential leader of Ukara until his death in 1964. His legacy is still strong in my interviewees' accounts, in spite of the wide array of opinions regarding his rule. Some of the respondents viewed Mataba as the enlightened and fair ruler who instructed the Kara to cultivate effectively and persistently defended his people's rights against the British colonial administrators. This latter point of view is reflected in Donald Barton's (2004) account of his time as the Ukerewe District Commissioner in the 1950s as he describes Mataba as being a 'slothful' character, who was always reluctant towards any type of cooperation. In conflict with these opinions,

nonetheless, was the almost equally common stance of my interviewees to describe Chief Mataba's reign as predatory and cruel. I was able to visit his old house in Bukiko, which had not been inhabited for a long time, but was still impressingly large and well-built house with white brick walls and red metal roof. It is difficult to draw certain conclusions, but in any case it seems likely that Mataba and his father Matete played a key role in controlling land use on the island and kept Ukara relatively isolated from outside influences, while gaining considerable wealth for themselves.

According to Paterson (1956, p. 55) the islanders were forced to pay tax and also a tribute for the chief and village headmen only after the Germans had helped Matete to rise to a position of power. He adds that Ukara has historically been a safe haven with no internal strife or fighting, although it seems probable that mild resistance had occurred towards Chief Mataba's rule during the British colonial era, as he was quoted to having forcefully grabbed land and wives from other lineages (P4). Ludwig (1968, p. 91) remarks that the difference in the level of outside connections between Ukara and Ukerewe is evident. He notes that Ukerewe has been open to traffic, trade and subject to a close colonial rule, Ukara has 'generally been left to itself, largely due to the inhabitants' unfriendly attitude toward strangers' (ibid.). Two local elders (P24, P25) informed me that prior to year 1950 villagers in Bukiko had no connections to outsiders, but this changed in mid-1950s when traders from that village travelled sell to cassava flour in Maguu as prices were higher there. Chacker (1968, p. 83-84) gives further evidence to this isolation by explaining how the first British missionaries on Ukerewe attempted to pass Ukara in 1875 with their boats but were suddenly attacked by the Kara who wounded them before they managed to escape.

5.3 Population Density on Ukara

The patchy pattern of population densities in Eastern Africa has been a question that has puzzled researchers for decades. In Tanzania alone, population densities vary significantly, even across locations with seemingly similar climatic conditions. As early as 1936, Gillman tried to explain these differences by the existence of a domestic water supply, which remains a convincing argument to this day. His theory was in the 1940s criticised by Nowack, who placed more explanatory power on historical factors, such as migrations, war, refuge, trade routes and influence of powerful chiefs. (Widgren, 2004,

p. 3.) Alongside with the successful agricultural adaptation by the Kara, some of Nowack's factors do have significance in explaining population growth on Ukara. According to Hartwig (1968, p. 53) many Kara people migrated to the northern part of Ukerewe over the course of the 19th century because on their native island they "experienced a shortage of food caused by high population density", a problem that "existed on a recurrent and virtually annual basis". He further sheds light to the fact that customarily the Kara immigrants occupied low social positions and worked mainly as agricultural labourers. In the Kerewe society they formed a separate social stratum, and intermarriage between social and ethnic divisions was not allowed (ibid., p. 112). Trade relations between the two islands have also existed for a long time. During the 19th century cattle and hides from Ukara were traded to Ukerewe, but Hartwig (ibid., p. 109-110) does not report what the Kara received in exchange. It could have been salt or iron tools that the Kerewe were able to access through their wide trade networks. The livelihoods of Ukara have definitely been affected by the proximity of Ukerewe through migration, trade and the general political economy. Space does not allow for a more detailed historical insight to the fluctuating relations between the two islands, their leaders and their people, but self-evidently the nearness of the bigger island has influenced life on Ukara.

5.3.1 Changes in Population Levels Since the 1920s

The population densities found on Ukara were astonishing already at pre-colonial times, in Ludwig's (1968, p. 87) opinion, at least during the 17th century. The whole Lake Victoria region has been a major population hub in Sub-Saharan Africa for centuries, but even compared to the rest of the region, on Ukara the numbers of human population have been exceptionally high. As explained earlier, European visitors to Ukara remarked this as early as the late 19th century[12]. Already in the 19th century many Kara migrants had moved to northern parts of Ukerewe due to the limited land available for farming on Ukara (Hartwig 1976), and in 1926 there had been a focussed attempt to move people from Ukara to the eastern parts of the Baumann Gulf, located on the mainland, east of Ukerewe (Hatchell 1957, p. 199).

[12] E.g. Dr Oskar Baumann in the early 1890s.

It is very difficult to find detailed data on population concerning the more distant past, but in an article published in the NY Times in year 1920, the population was approximated to stand at 19 000 (NY Times, 1920). The accuracy of this estimation is dubious as no source is quoted in the article, but it is roughly in line with the numbers presented by Ludwig (1968, p. 94), as he puts the local population at 16,989 in year 1928; 17,506 in 1931; 16,501 in 1948; and 16,052 in 1957. The statistics used by Thornton and Rounce (1936, p. 25) are exactly the same as Ludwig's for year 1931, but they further elaborate that 49.5% were males and 50.5% females; 55.8% were classified as adults and 44.2% as children. In Ludwig's opinion, the minimal change in population was due to the rapidly growing out-migration over the same period. He states that the number of Kara living outside of Ukara grew from 6,478 in year 1928 to a figure of 18,365 in 1957 (ibid.).

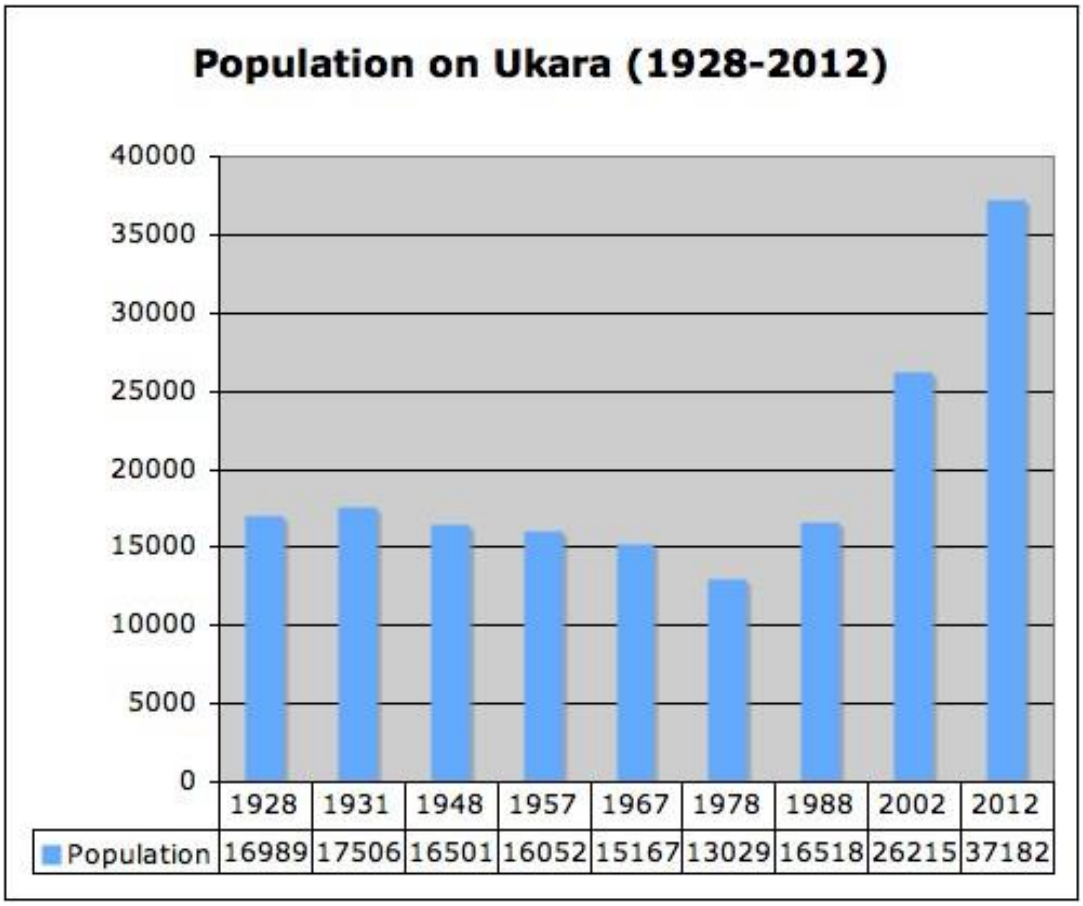

Figure 2: Population on Ukara Island,
Sources: Years 1928-1957, Ludwig, HD (1968, p. 94);
Years 1967-2012, Tanzania Central Census Office, National Bureau of Statistics

Tanganyika gained its independence in 1961, and formed a union with Zanzibar on 1964, which was to be called the United Republic of Tanzania. The first official census

of the era of independence was conducted in 1967. Figure 2 presents this census data on Ukara's population derived from the censuses of 1967, 1978, 1988, 2002 and 2012, alongside with Ludwig's data covering years 1928, 1931, 1948 and 1957. What is notable, first of all, is the fact that over this time period, the total population has risen tremendously, from 15 617 people in 1967 up to more than 37 000 in the latest census of 2012. The Malthusian trap concerning the limits of population pressure has definitely either been transcended or postponed. Secondly, we can see the impact of the Ujamaa villagisation project undertaken in 1973-1975 in the diminished number of inhabitants between years 1967 and 1978. During this time, thousands of Kara were re-settled to other parts of Tanzania, mainly to Sengerema and Geita. According to official government statistics, as many as 9 million Tanzanians were voluntarily or forcefully re-settled in the mid-1970s (Mapolu 1985, p. 119). This bold endeavour by the socialist government did not present a permanent solution to the problem of land scarcity, however, as there has been a steady rise in the total population since 1978. Thirdly, there is a further striking surge in population between the censuses of 2002 and 2012. Based on my study, the most important factor behind this rapid surge of population growth is the sudden expansion of commercial fishing activities – namely the fishing of the silver cyprinid or *dagaa* – on Ukara.

Next, I will take a look at the more recent population statistics. Relevant data derived from the 2012 national census is given below in Table 3. It is noteworthy that population on Ukara has not been divided equally between the four wards. The southernmost Bwisya ward, consisting of the two villages of Bwisya and Nyang'ombe, has a population of 13,141 people - or differently put, 35.3% of the island's population. The western Bukungu ward, consisting of the villages of Bukungu and Chifule, is inhabited by 8,548 people, or 23% of total. The eastern Bukiko ward includes the villages of Bukiko and Kome, and has a population of 8,071, or 21.7%. The northern Nyamanga ward, including the villages of Nyamanga and Chibasi, has 7,422 inhabitants, which accounts for 20% of the whole population of Ukara. (NBS, 2013)

Ward	Total population	Male	Female	No. of households	Avg. household size
Bwisya	13 141	6 533	6 608	2 120	6.2
Bukungu	8 548	4 287	4 261	1 474	5.8
Bukiko	8 071	3 618	3 804	1205	6.7
Nyamanga	7 422	4 012	4 059	1108	6.7
TOTAL	**37 182**	**18 450**	**18 732**	**5 907**	**6.3**

Table 3: Population and household statistics on Ukara Island by ward in 2012
Source: National Bureau of Statistics, Census 2012

According to the same census data set, there is no great variation in the average household sizes between the four wards. In Bwisya ward there are 2,120 households, the average household size being 6.2 persons per household. In Bukungu ward, the total number of households is 1,474, with an average of 5.8 persons per household. In Bukiko ward, there are 1,205 households, and the average size is 6.7. In Nyamanga ward, the number of households is 1,108, the average size being similar to Bukiko, 6.7 inhabitants per household. As I have noted in the methodology chapter, defining a household is not always an uncomplicated task, but here I must rely on the uniformity of the national statistics. Hence, we can note that the average household size of 6.3 on Ukara is remarkably higher than the national average of 4.8 people per household. (Ibid.) According to the questionnaire data that I collected at Bwisya Secondary School, the average size of the respondents' households is 9.0 people, the median being 8 people. The data collected by myself has been compiled in a different manner than the government statistics, but both data sets point to the fact that households on Ukara are large. It is a typical occurrence that when there is shortage of arable land to inherit from one's parents, the average household size tends to grow because the married sons are

not able to move out of their parents homestead. The large household sizes naturally have many important implications for the livelihood systems on Ukara.

5.3.2 Rethinking the Mainstream Population Pressure Theories

In development studies, the narratives relating population growth to environmental degradation have been dominated by two competing approaches. The Malthusian or neo-Malthusian theories have claimed that as population pressure on land increases, famine will inevitably follow, because food production cannot keep up with population growth. In the original formulation of such theory, population grows at a geometric rate, while the food production capacity only grows arithmetically. They are attributed to Thomas R. Malthus' classic work An Essay on the Principle of Population (1973/1798) where the author states that there are two types of checks, *positive* and *preventive*, that naturally hinder population growth when there are too many people relative to the primary resources, especially land. In his view, the positive checks that increase the death rate include famine, epidemics and war. Preventive checks decrease the birth rate and include man-made solutions, such as birth control, celibacy and postponement of marriage. It is clear that population growth can be seen as a threat to livelihoods on Ukara, too, but the proponents of the Malthusian view tend to neglect the different livelihood solutions that people may pursue even amid high population pressure on land. On Ukara, these options have included a further intensification of agriculture, a more committed engagement in the commercial fishing sector and an increased reliance on work-related migration and remittances. More recently, the case of the Akamba farmers of the Machakos District in Kenya has received attention as a clear example of the development of endogenous agricultural innovations that have simultaneously led to both rapid growth in population density and positive changes in environmental conservation and productivity between years1930 and 1990 (Tiffen, 1993; Mortimore & Tiffen, 1994).

Another major theory of the relation between population growth and agriculture is the Boserupian approach, which is attributed to Esther Boserup and particularly to her work The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure (1965). This perspective takes a much more positive stance towards population growth, in stating that population pressure can actually lead to agricultural

intensification and environmental conservation. According to the Boserupian thesis, there is much more elasticity in the possible output of food production than assumed by Malthus (Boserup 1965, p. 11). In addition to this, through technological innovation and new agricultural methods, the food output may respond far more generously to added inputs than Malthus expected, mainly because farmers were much more adaptive in response to population pressure (ibid, p. 14).

In a more recent article, Lowe Börjeson (2007) challenges Boserup's idea of population pressure being the determinant for agricultural change. Börjeson (ibid., p. 249) states that "it is possible to imagine the reversed process, whereby intensive agricultural practices may stimulate population growth, particularly through migration". He uses a case study of the Iraqw of the Mbulu Highlands, Tanzania, to show that historically they have rather managed to grow in numbers following agricultural advancements than the other way round. In other words, while he admits a commonly occurring causality between high population density and intensive farming, he refutes Boserup's idea of any evident causation between the two (ibid., p. 252).

An even more complex and nuanced approach is put forward by De Sharbinin et al. (2007, p. 355) who point out that the relationship between population dynamics and environment is not monocausal or simple. Instead, they posit that population is only one of many factors that have an impact on either environmental degradation or agricultural intensification. In their opinion, other variables may include institutional factors (e.g. land tenure, local governance), market linkages (roads, crop prices), social conditions (education, inequality of landholdings), or the biophysical environment (original soil quality, climatic conditions). This perspective is key for my own analysis. Based on my fieldwork, it seems certain that the important adaptations in the local livelihoods – both in the farm, off-farm and non-farm sectors – have definitely played a major role in lifting, or at least temporarily easing, some constraints on population growth on the island. In the following chapter I will combine data derived from relevant literature and from the interviews I conducted on Ukara in order to show how the changes in the local livelihoods can explain the surge in the population densities on the island since the 1970s. There is some compelling evidence that the local households have been able to modify their livelihood portfolios in order to survive, become more resilient and create additional surpluses for investment.

5.3.3 Is Ukara's History a 'History Under Siege'?

The historically high population densities on Ukara have been mainly due to the intensive agriculture, but explaining how and why the Kara began to develop their distinctive methods is not clear. It is a very intriguing question to try to figure out how this all actually took place, as in East Africa, population densities have generally been low on average, although there has been some variation. Two main strands of explanations can be found in the academic literature. The first school of thought argues that the African farmers would only have adopted labour-demanding, soil-conserving techniques if there was a special emergency. (Widgren, 2010.) This idea is closely linked to the 'siege thesis' or rather the 'siege hypothesis', originally put forward by Pierre Gourou (1966, pp. 103–108) and later supported by Ruthenberg (1971) who also used the case of Ukara as part of his argumentation. The second strand of literature visions the development of intensive farming practices as being merely a pragmatic response to the low productivity of agriculture (Widgren, 2010).

The siege hypothesis implies that grain-based intensive farming systems have typically developed in locations where the local farmers simply have not been able to further extensify cultivation due to ecological or socio-historical reasons. A typical example could be a mountain retreat, an island, or a location surrounded by hostile neighbouring ethnic groups. Lowe Börjeson (2004; 2007) has studied closely one location of intensive agriculture in Tanzania, that of the Iraqw'ar Da/aw of the Mbulu Highlands. His analysis ranges from the 19th century to the present. While the case of the Iraqw'ar Da/aw fulfils the criterion of a typical siege situation, as they were kept under siege by the pastoral Maasai and Datoga people during the 19th century, Börjeson (2004) largely refutes the siege hypothesis. Instead, he concludes that rather arising from a sheer necessity, the agricultural intensification of the Iraqw was developed due to its own driving force and not as direct solution to land scarcity. Kjekshus (1996) views the historical process differently, and proposes that actually in the pre-colonial era intensive farming practices were far more common, but that the colonial administration brought about severe disruptions which caused farmers in most locations to adapt more extensive forms of shifting cultivation. This proposition has been refuted by Koponen (1988) who regards Kjekshus' vision of pre-colonial farming conditions as overtly positive and belonging to the 'merrie Africa' school of thought.

Also Widgren (2005) criticises the siege hypothesis by claiming that the causes for agricultural specialisation are more likely to be embedded in the complex regional socio-economic relationships than a direct response to being forced to live in certain, limited areas. In his view, the concepts of ’siege’ or an ’island of intensive agriculture’ communicate an idea of a situation of isolation from the neighbouring communities, which is often inaccurate. While there has been a great interest by geographers and historians to study these African intensive farming systems, it is context-dependent whether the reasons for intensification can be found in ecological characteristics, cultural practices, political centralisation or, in Boserupian terms, population density. Also in his more recent work on the numerous intensive farming systems of West Africa and Sudan, Widgren (2010) concludes that no definitive ecological or social preconditions for the historical development of such systems can be found. On the contrary, Widgren (ibid., p. 337) states that intensification took place from the lowlands to the hilled areas and in both decentralized and hierarchical societies.

I feel that it is beyond the scope of this study to scrutinize the siege hypothesis further, as no new viewpoints on the historical origins of intensive farming on Ukara arise from the interview data. While it is appropriate for me to focus on the more recent development of population trends and livelihoods on the island, it is necessary to acknowledge that much of the academic literature on Ukara has indeed utilised this locality as an example of atypical, grain-based intensive farming system in pre-colonial East Africa. In the following chapter I will proceed to examine the local livelihoods in more detail. Special attention will be paid to activities related to agriculture and fishing, as these form the most important parts of food production and income-generation for the local households.

6 Livelihoods on Ukara

Understanding the local livelihoods is the essential key to explaining how Ukara has been able to sustain the enormous population densities described above. In terms of existing literature, Ukara has always been framed as a unique case of intensive agriculture with high population pressure on land. I will not depart from this view entirely, but acknowledge that there is an urgent need to understand the dynamic and multidimensional nature of the local livelihoods. As Oumer & al. (2013) have witnessed in Ethiopia, the overall livelihood strategy of a household explains the soil management techniques better than any independent variable. For this reason they suggest that any development intervention aiming at promoting soil conserving measures should have a thorough analysis of the local livelihoods as a starting point.

Livelihoods on Ukara are not based on cultivation alone. Access to arable land holdings is almost completely restricted for the ethnic Kara, due to an inflexible system of land ownership based on private ownership, inheritance and the seemingly discriminatory local conventions regarding the selling and buying of farmland. However, even people who have come from elsewhere have been able to rent land or access it through intermarriage with the Kara. The majority of farmers on Ukara are still ethnic Kara due to these restrictions and the fact that normally one can only buy or rent very small plots of land of poor quality.

Nonetheless, the rapid rise of the commercial fishing business based on the Nile perch since the 1980s and more recently on the silver cyprinid during the past decade, has provided employment opportunities for young men regardless of ethnic background. Contrary to the restricted entry to agriculture on Ukara, the open-access nature of the Lake Victoria fishery makes it easy for any able-bodied and skilled young man to try to find work in a fishing camp as crewmembers. Meanwhile, women and children may be able to engage in the work phases related to the drying and processing of the fish. Actually most fishermen engaged in the fishing of the Nile perch do come from outside of Ukara, as the Kara have not traditionally been active in targeting this particular species due to both insufficient skills and cultural customs. The fast growth of the fishing camps, especially along the eastern and northern coasts of Ukara, have provided new markets for both produced agricultural surplus and many types of services and manufactures. The fisherfolk – including the crew members, boat owners, fishmongers, transporters and traders – are typically wholly reliant on local markets in buying

foodstuffs, clothes, medicine and other basic necessities. The local Kara households have been able to diversify their livelihood portfolios through engaging in these non-farm employment and income-generating opportunities.

Depending on the particular strategies adopted by each particular household, these developments may have had positive or negative consequences. At best, the local households have been able to accumulate wealth and smooth consumption. The latter can be achieved through successful production or employment choices, including diversification. Another way to smooth consumption is much less preferable, and it includes a variety of more acute risk-aversion strategies, such as depleting the household asset base or borrowing. (Morduch, 1995, p. 104.) At worst, the less privileged households with insufficient capital and/or labour available have suffered from the rising price levels caused by the elevated demand. While contributing to some unprecedented levels of social differentiation between rural households on Ukara, I will show that these changes in the local livelihoods have allowed for the higher population densities on the island.

6.1 Ukara as a Unique Case of Intensive Agriculture

Agriculture including both crop cultivation and livestock rearing has always been the economic backbone for the majority of Kara households living on the island. Most households are small-holders and own their fields that tend to be tiny and dispersed because of the local system of inheritance, which dictates that the father divides the family fields between his married sons. The Kara, however, are both extremely careful and skilful in taking the measures needed to reap meaningful harvests while preserving the fertility of the fragile soils. The small size and fragmented nature of landholdings is probably the most striking characteristic of crop cultivation on Ukara. It is also the key feature that explains why farming on the island is so difficult, and why many people are looking to move out of Ukara in their search for more substantial fields to cultivate.

Next, I will explore the role of agriculture in the local farming households' livelihood strategies. I will mix the existing literature with the data derived from interviews and survey responses. First, I will briefly describe the natural environment for cultivation, and then proceed to depicting an overview of the intensive farming practices, role of livestock-keeping for cultivation and the important issue of crop selection. Following

this, I will present the complex processes related to gaining access to land and its consequences. According to my informants, the acreage and quality of arable land accessed remains an important determinant for the viability of a local household's livelihood strategy.

6.1.1 Natural Environment for Cultivation

Most land on Ukara is under cultivation. According to Ludwig (1968, p. 99), as much as 98.6% of the total area was used agriculturally during his fieldwork in 1964-65. He describes the remaining 1.4% of unproductive area as being either settlement areas, rocky areas in the hills, sandy river-courses or regions where erosion has seriously diminished soil fertility. Ludwig also quotes the Kara methods of agriculture as being uniquely intensive in sub-Saharan Africa. In his view, comparable permanent farming systems have only developed among the Konso in Ethiopia, the Kabre in Togo, the Adamawe in Cameroon, and the Sokoto and the Kano in Nigeria (ibid.), but more recently other similar localities have been found with current or past systems of permanent, labour-intensive farming practices. Most notable of those in East Africa are the abandoned site in Engaruka, Tanzania (Stump, 2006), the living irrigation system of Pokot (Davies, 2008), hill-furrow irrigation in Marakwet, Kenya (Östberg, 2004) and the Iraqw'ar Da/aw of Tanzania (Börjeson, 2004). Even higher number of intensive farming systems can be found in the hilly areas of West Africa and Sudan (Widgren, 2010). But on Ukara, the average population densities have historically been higher than elsewhere. Widgren (2004) notes that the intensity of farming is closely related to precipitation patterns and topography. In his view, however, it is difficult to state clearly where the intensity of farming has been made possible by the suitable environmental conditions for cultivation, and where the intensity is primarily a consequence of labour investments in land (ibid.).

Similarly, Le Blanc and Perez (2008)[13] have suggested that water constitutes a binding constrain to reaching high human densities. In their view, an annual precipitation rate of 900mm of rainfall is an important limit that restricts many rural areas within Sub-Saharan Africa from developing higher populations. It is uncertain, how suitable their

[13] Le Blanc and Perez' (2008) view is very much similar to that presented by Gillman already in 1930s (in: Widgren, 2004).

prediction is when the area under consideration is an island, where water is easily available throughout the year, especially for drinking. In the case of Ukara it has to be noted that the local irrigation methods are still insufficient and that drinking water from Lake Victoria is a major cause for diarrhea and is often contaminated with *Schistosoma haematobium* worms that can enter blood vessels and lead to bilharzia infection[14].

Environmental conditions for crop cultivation on Ukara are harsh. The rainfall, however, is at a higher level than in other parts of Tanzania. Over the period of 1978 to 1993, the average annual rainfall on Ukara was 1172mm, ranging from 726 to 1532mm (Meertens & Lupeja, 1996, p. 69). Normally the rainy season begins in September and ends in May. The pattern is bimodal, with most rain falling in November-December ('short rains') and March-April ('long rains'). January and February tend to be dry months, and from June to September there is hardly any rain. However, in spite of this general pattern, the rains can be unpredictable and tend to come in the form of heavy showers, which is not favourable for agriculture. (Ibid., p. 4.)

If we consider Sub-Saharan Africa as a whole, we can state that the region is highly vulnerable to the wider phenomenon of global warming. Speranza (2010) writes that among the climate change is manifesting itself in East Africa in the decreasing reliability of rainfall, increasing average temperatures and in the severity of extreme climate events. While admitting that the current climate models are uncertain, she notes that is likely that in Eastern Africa, the mean annual rainfalls will increase, but with remarkable regional differentiation. Thus, the farmers on Ukara need to adapt their cultivation patterns in the face of these environmental challenges.

6.1.2 Local Agricultural Innovations

The more pressing matter, reducing the productivity of agriculture, is the poor quality of soils. According to Meertens & Lupeja (1996, p. 8), the most common types of soil on Ukara are locally called either *luseni ('*a bleached, infertile sand*')* or *nduha* ('a reddish moderately fertile sandy clay'). These soil types are not suitable for continuous

[14] Schistosomiasis or bilharzia is a tropical parasitic disease caused by blood-dwelling fluke worms of the genus Schistosoma (Gryseels et al. 2006). Downs et al (2011) studied 457 women of 18 to 50 years of age living in rural villages in Lake Victoria region. They found out that the overall 5% of the women studied suffered from female urogenital schistosomiasis. This variety of the disease can lead to infertility and is also a risk factor for HIV infection. However, schistosomiasis is characterised by relatively low mortality rates (Mwanga et al. 2013).

cultivation, but because of the high population densities and limited availability of land, it has not been possible to let the fields lie fallow on Ukara. A local solution to this problem of sustaining soil fertility without allowing a fallow period was found early on: the use of livestock manure on the fields, demanding excessive amounts of labour input. During the 20th century, the primary research focus on Ukara was about the governance of ecological resources and the non-orthodox methods of cultivation developed on the island. In the next couple of paragraphs I will present the key findings of the earlier literature.

Ludwig (1968) concluded that Ukara was only able to sustain high population densities mainly because of the development of sophisticated cultivation techniques and the out-migration of surplus population. In times of scarcity, people were able to move to other islands or to the mainland. Ludwig (ibid.) speculated that the highly intensive agriculture on Ukara was based on a) permanent crop rotation without fallow periods; b) stall-feeding of the cattle in order to collect manure for fertilising the fields; c) advanced methods of irrigation; and d) determined measures taken to prevent soil erosion. Koponen (1988, p. 225) also mentions Ukara as an exceptional place because proper terracing cultivation was found there already at early times, which was rare in Africa. According to my observations, these characteristics of the local cultivation system are still in place, even though the cropping patterns have changed.

Ukara is named as "the most intensive cultivation system in the Tanzanian area" by Juhani Koponen (1988, p. 235). He elaborates that this system is also unique for being based not on banana but on grain. The local agricultural technologies that Koponen (ibid.)[15] mentions include a combination of green and dung manuring; irrigation; intercropping, crop rotation and proper terracing. He goes on to explain that the main crops were bulrush millet and bambara groundnuts, and that only wooden tools were used (ibid.). Contrasting this, nowadays millet is a minor crop and most tools used on Ukara are made of iron or steel, including hoes, sickles and knifes. However, all agriculture on the island is still wholly reliant on manual human labour, and neither mechanised machinery nor draught animals are used. In any case the local methods of cultivation have demanded plenty of manual labour and long hours of work on the fields. Ludwig (1968) notes that the Kara method of cultivation was providing a sustainable livelihood for most local households, but was only able to do so through

[15] Koponen (1988, pp. 225, 235-236) refers here to the following works that I have not been personally able to access: H. Hermann v. Schweinitz und Krain (1893); Baumann (1896); Sturdy (1936).

very low returns per each hour spent labouring on the fields. According to Ruthenberg (1971, p. 116-117) the Kara have been well aware of their farming system producing higher yields per hectare than in the more extensive systems, but that the production has been lower per man-hour. Even today, all cultivation is done by hand, probably because the use of tractors or draught animals is not meaningful due to the related costs, the small size of the fields, the dissected landscape and the local cultural traditions attached to cultivation. One of the reasons is also that the benefits derived from the use of oxen on the fields would be very limited as most of the plots are tightly intercropped.

Allan (1965: 201-203) adds that livestock manure was vital for keeping the soils fertile, but that it was not easily available in sufficient amounts. The local response to this problem was the invention of a specific type of composting system which allowed the farmers to turn unusable plant parts into a suitable fertiliser. He writes that in the 1960s the major crops cultivated on Ukara were millet, sorghum and beans. Crops of lesser importance included cassava, sweet potatoes and rice. He notes that rice was primarily a cash crop for the Kara, and that the profits earned for its sales were used to pay taxes to the government. Crop cultivation on Ukara has always been primarily for own use, thus Kara households are typically 'subsistence farmers'. Currently cassava is by far the most commonly cultivated crop. Maize has also been used on Ukara, but it is still of relatively minor importance, and regarded as more of a titbit or delicacy. Nowadays, maize cobs are typically fried and eaten as snacks between meals only, but there are also small locally operated mills for producing maize flour.

Ludwig (ibid., pp. 101, 104) makes a distinction between cultivation on: (a) the unirrigated, rain-fed land; and (b) on the irrigation farming on the river lowlands and the narrow lake-shore regions. During his fieldwork in 1964, the former, unirrigated cultivation covered 73.6% of all land on Ukara. The most important crops were bulrush millet (*Pennisetum typhoideum*, 'mawele' in Swahili), finger millet (*Eleusine coracana*, 'mtama') and sorghum (*Sorghum vulgare*, 'ulezi'), but also bambara groundnuts (*Voandazeia subterranea*, 'njugumawe'), sweet potatoes (*Ipomea batatas*, 'kiazi') and cassava (*Manihot esculenta*, 'muhogo') were cultivated. On the irrigated areas, consisting 6.6% of all land, mainly rice was and still is being grown, often interplanted with sweet potatoes, bambara groundnuts and sorghum.

Currently the main crop on Ukara is cassava, as explained earlier. In addition to this, sweet potatoes are another valuable source of daily calorie intake. Many people also

cultivate wetland rice, maize, sorghum, beans, bambara groundnuts and bulrush millet, but these are not as widely used as cassava and sweet potatoes. Almost every household also has fruit trees, such as mango, papaya, avocado and banana. Less common fruits are pineapples and oranges, which are both produced in large quantities on Ukerewe and transported to be sold also on Ukara, especially at the Bwisya village marketplace. Also some vegetables, like tomatoes and onions, are being grown, but not frequently, and usually on a very limited scale.

Ludwig (ibid, p. 108) states that rice from Ukara was sold to the Christian missionaries on Ukerewe already at the beginning of the 20th century, while during the 1920s most rice consumed in Mwanza originated from Ukara. As a cash crop rice was never nearly as profitable as cotton grown on Ukerewe (ibid, 132). Nonetheless, the refusal to introduce cotton farming on Ukara - in spite of insistence by the colonial administration - is commonly mentioned as the late Chief Mataba's greatest achievement in the Kara folklore. According to Mapolu (1985, p. 109) boiling cotton seeds prior to planting them was indeed a very popular form of passive resistance towards the colonial administration throughout Tanganyika. On Ukerewe, many farmers faced extreme hardships when cotton prices declined and the soil degradation caused by cotton growing became evident (Vilby, 2007).

The largest rice fields are located along the riverbeds in the south-western Bukungu area, but smaller patches of cultivated rice can also be found in the eastern part of the island. There are no rain-fed rice fields, but all rice paddies are irrigated with water from the rivers. Rice cultivation can be a major health risk, because the stagnant water provides an ideal breeding site for the malarial mosquitoes. This worry has been confirmed by Ijumba et al. (2002), although they interestingly conclude that at the site of their study, near Kilimanjaro, the local rice-farming villages were actually suffering less from malaria than the neighbouring villages, because the money derived from rice sales guaranteed the local farmers better access to bed nets and health services.

Another valuable insight to Ukara is provided by John Reader in his renowned work *Africa: A Biography of the Continent* (1997, pp. 255-258). Reader states that the high population density on the island can be explained through the private ownership of land which has been historically rather unusual in the Sub-Saharan African context but had developed on Ukara already at early times. He claims that all land, trees and, in principle, each blade of grass, is privately owned, which has contributed to the need for

the local people to take measures against land erosion. Also Allan (1965, p. 202) presents the same idea and remarks that plots of land and even single trees were sold and exchanged between families. Allan adds, however, that the measures taken by local farmers were not sufficient to stop the soil from turning gradually less fertile. Allan (also Koponen 1988, p. 368) refers to an older study by Thornton and Rounce (1936), which proposes that the soil was even improving in quality through the use of manure, but Allan (1965, p. 202) views later research by Lunan and Brewin as more reliable in stating that in fact soil fertility had declined significantly.

According to Kjekshus (1996, p. 44) it is probable that the unique development of agricultural techniques reached its zenith on Ukara already by the end of the 19th century, because already the two late 19th century travellers Baumann and Kollmann had described similar methods in their writings. In Kjekshus' (ibid.) opinion it seems likely that only limited further development of agricultural methods has occurred on Ukara since that time. I think that he has a point in claiming that no radical innovations have taken place in the Kara farming system, as the methods described by Thornton and Rounce (1936) are mainly still in place, and have remained rather unchanged. Nonetheless, the adoption of cassava as the main crop has had remarkable consequences as far as the labour needs and the annual seasonality in agriculture are being concerned. Interestingly, the governments statistics regarding agricultural extension services regarding the whole of Mwanza Region, confirm that out of all seven districts within the regional administration, agricultural extension is weakest in Ukerewe district. Only 28.5% of the crop-growing households in Ukerewe district had received any extension services over the past 12 months in 2007, whereas in Ilemela district the rate was as high as 85.8%. (Ministry of Agriculture 2012, p. 56) Ukara being located in the periphery of Ukerewe district, it is likely that the percentage is much lower there. The low availability of extension services, tools and inputs are clearly one reason for the slow evolution of agricultural methods.

6.1.3 Role of Livestock in the Kara Farming System

The role of livestock in the Kara cultivation system is extremely important. Due to the weak soils on the island, all cultivating households must have at least one head of cattle in order to produce manure for their fields. The local farmers share the idea that rain-fed

land must be manured on a regular basis or it will decline in fertility. Traditionally cattle has been stabled inside the Kara huts - a practice described by both Thornton and Rounce (1936) and Ludwig (1968, p. 112) - but today the animals either have their own simple stables or are just kept outside. As there is a need to collect all the manure to be composted with green manure and be taken to the fields, especially the bulls are always kept tied in their stables. This method of *zero-grazing* also makes sense regarding the very limited availability of grazing land on the island.

> Manuring the fields is very important. But animal manure will never suffice, we must also use green manure. We bring grass, leaves and weeds to the cattle stalls and mix it with their manure. After four months or the composted mixture is ready to be used on the fields.
> (Woman, housewife and farmer, 50 years old, P19)

Another reason for zero-grazing is that when brought up this way, the bulls tend to grow bigger in size (P16). For many households a large bull is a major asset that can be sold locally or on Ukerewe for a price reaching up to 700 000 TSH. Cows, on the other hand, are typically taken to grazing by the young boys in the household, but even then the manure is often collected and carried home. When reared towards the grazing land, the cows must wear muzzles in order avoid them eating anything from other farmers' fields. This is also important for the animals' health as my informants told that they had witnessed cows dying from eating the bitter varieties of cassava tubers as they may contain poisonous cyanide.

According to my observations, most households have one to three heads of cattle. In the Bwisya Secondary School's students responses the average number of cattle per household is 3.8 heads, the median being 3. But as noted earlier, these students are not likely to belong to the most vulnerable households on Ukara, even though most of them stated that they have suffered from hunger over the past years. The low number of cattle is due to the fact that having more would prove to be problematic, owing to the limited availability of land for grazing or grown fodder. Few households have more than 10 heads, and cattle are not mainly used for storing wealth, which is typical to many pastoralists in different parts of rural Africa (e.g. Dercon, 1998, p. 10). In spite of this, even on Ukara cattle tends to be a rather reliable indicator of relative wealth and form one of the most important parts of any household's assets. However, there are also households who do not have cattle, and they typically need to buy manure from other

farmers. One informant (P2) explained that the cost of manure is very high, because the more one applies it to one's fields, the better harvest he will get. For this reason it is difficult to buy manure on Ukara. One particularly knowledgeable man (P24), aged 75 and living in Bukiko, insisted that the Kara do not want to hire land to people coming from elsewhere, because they are too careless with their cultivation methods:

> The diminishing appreciation of agricultural work has come about because of outside influences. People do not use enough cow dung to manure their fields anymore. This is why their harvests are so small. Many people who have come from elsewhere do not understand the traditional methods of cultivation of the Kara. For instance, some Kara men have married women from Ukerewe. But these women do not utilise composted manure, because they are not familiar with the system and because they think that it is too hard work.
> (Man, retired, 75 years old, P24)

In Table 4, I have collected data on the numbers of livestock on Ukara in years 1931, 1965 and 2011. All the data sets are from different sources and I have not had the chance to review their methodologies. Thus one should treat these as well-informed predictions at best. Nonetheless, a couple of interesting trends are made visible here. Firstly, the number of cattle seems to have dropped steeply from 15 000 heads in 1931 to less than 4000 in 1968. Later, this number more than doubles to over 8200 in 2011. While it seems likely that the earliest of the figures is inflated, it is still quite well possible that there has been a cattle disease of some kind over that period. This vision, however, is improbable as Ludwig (1968, p. 114) states that in spite of no veterinary treatment being pursued on Ukara, the island has not been affected by cattle sickness, e.g. trypanosomiasis. Secondly, the numbers of goats show a rather similar trend, which in all probability is mainly due to the dubious data for year 1931. It is anyhow curious to note how the number of goats grows five-fold between 1965 and 2011, a trend predicted by Ruthenberg (1971, p. 111) by stating that: "With the reduction of the grazing areas, the rearing of goats, pigs, and fowls increases in relative importance. In requiring less grazing land and providing smaller units for sale or consumption, this kind of stock is better suited to the economic condition of smallholdings."

	1936	**1965**	**2011**
Cattle	15 000	3 830	8 268
Sheep	5 000	4 860	31
Goats	16 000	1 030	5 040
Chicken	N/A	10 900	24 462

Table 4: Numbers of livestock on Ukara Island
Source: Data for year 1936 by Thornton & Rounce (1936), for year 1965 by Ludwig (1968, p. 102), and for year 2011 by livestock census data by Bwisya Livestock Extension Office, Ukara.

It needs to be noted here that in 2011 there were also as many as 9300 ducks but only 72 pigs on Ukara. These are not shown in the table, because no data was available for these species for years 1931 and 1965. The rearing of both doves and helmeted guineafowls seems to be emerging on Ukara, but in 2011 their total number amounted to just about 300 individuals. One more intriguing aspect of the livestock data is the almost complete disappearance of sheep on the island. In both 1931 and 1965 there are approximately 5000 sheep on Ukara, but in 2011 only 31. I did not see any sheep during my fieldwork and I did not discuss this issue with any of my interviewees. According to my research participants, in times of diminishing land available for grazing, the local farmers must prioritize animals that produce as much manure as possible in relation to their fodder consumption.

6.1.4 Adoption of Cassava During the 1970s

Since Ludwig's times on Ukara, one major change has taken place in agriculture. According to the local elders, cassava became the main crop on the island as recently as in the 1970s, mainly due to a government response to the deepening food insecurity on Ukara. On Ukerewe, maize and millet were slowly replaced by cassava since the

beginning of the large-scale commercial cotton farming in the 1930s, because high-yielding cassava was seen as the solution to feed the island with less land allocated to food crops (Iliffe 1979, p. 461). It is likely that the farmers on Ukara were following the example of Ukerewe when adopting cassava a few decades later. It is likely that the socialist government may have played a role in promoting the cultivation of cassava, but I have not been able to confirm this. Whether or not cassava was adopted mainly through indigenous learning or through an initiative by the government, remains somewhat unclear. One of my informants (P8) had worked as the secretary for the ujamaa village in Bukiko in the 1970s, and explained that there had been attempts to enhance the productivity of livestock keeping, but claimed that the local farmers were reluctant towards the governmental regulations and went on with their traditional methods.

Another socialist-era policy affecting farmers on Ukara was the radical re-settlement programme. As the government considered Ukara as being too densely settled, large numbers of people were re-setteled from Ukara to Sengerema and Geita in year 1974, as cultivable land was easily available in these locations (P8). Most Kara migrants have switched to shifting cultivation, after moving to places where land is abundant. This is a general observation as far as people moving out of many other types of intensive farming systems are considered. In any case, the fact that Ukara was an intensive farming system that was based on grain cultivation makes it a special case in Tanzania. According to Koponen (1988, p. 52-53), banana was the typical main crop in the more populous areas within the country, where insufficient rainfall was not a restricting issue. He adds that in locations of sparse population densities the main crops were cereals and the climate also typically drier.

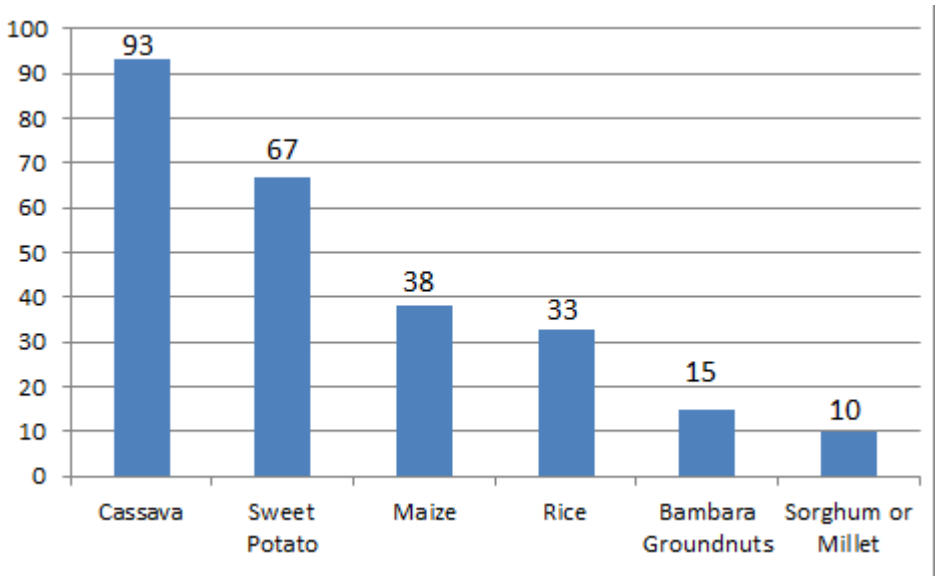

Figure 3: Percentage of respondents' households cultivating certain types of crops
Source: Questionnaire, Bwisya Secondary School, February 2014, conducted by Tomi Lounio.

According to both my observations and my data, nearly all households on Ukara have adopted cassava, a tuber plant, as their main crop. I have presented the data derived from the Bwisya Secondary School's students' responses in the graph above. Among the respondents (n=87) households, as many as 93% (n=81) stated that they are cultivating cassava. The second most commonly grown crop is sweet potato that is cultivated by 67% (n=58), followed by maize (38%, n=33) and rice (33%, n=29). Much less popular choices seem to be bambara groundnuts, cultivated by 15% (n=13) of households and grains including both sorghum and bulrush millet, that were cultivated by only 10% (n=9) of respondents. According to my observations, these numbers give a good overview of the current situation on Ukara, although it is possible that some respondents did mention bambara groundnuts, as they are not considered as an equally important crop when compared to others on the list. Another consideration is that possibly more rice-growing households are able to educate their children as rice remains the most important cash crop. In any case, this data proves a compelling evidence to the adoption of cassava as the main crop on Ukara.

There are a number of obvious reasons explaining this extremely quick, large-scale change in the local farming patterns. Cassava has some important benefits which explain its adoption by the majority of all farmers on the island. First of all, cassava is rather drought-tolerant crop that can be grown in ecologically harsh environments.

Cassava roots are a good source of carbohydrates, while its leaves provide protein and vitamins. On Ukara, however, the leaves are not eaten commonly. Cassava also yields more energy per hectare than other major crops. (Montagnac et al. 2009). Cassava is a tuber crop, not prone to harvest losses because of birds eating either the seeds or the ripening product, which was always threatening bulrush millet harvests. Cassava can also be harvested all year round, which reduces the likelihood of a hungry season. (IFAD, 2005) The adoption of cassava on Ukara conforms to Ruthenberg's (1980) prediction that increasing agricultural intensification in densely populated areas will lead to a shift from traditional cereals to higher yielding roots and tubers.

In spite of some clear benefits for the local livelihoods, cassava cultivation on Ukara has not been entirely problem-free. One concern is the nutritious values of the crop, because while being rich in carbohydrates, cassava root is providing essentially less protein than cereals. Another worry is that cassava would deplete the soil more rapidly than other crops, but this claim seems to be a myth. (IFAD, 2005) The third issue is the crop's relative vulnerability to pests and disease. The harvests have been severely affected by the 'African cassava mosaic virus' (ACMV), which is one of the greatest causes of crop losses in all sub-Saharan Africa. In Tanzania, this disease has been especially prevalent in the high altitude areas in the interior parts of the country, while a very similar virus called the East African cassava mosaic virus (EACMV) is more common in the coastal regions.

According to Legg and Raya (1998), Ukerewe Island became one of the most heavily infested areas, following the introduction of cassava cuttings from other parts of the country. The cuttings were brought in order to tackle the grave damage caused by the 'cassava mealybug' (Phenacoccus manihoti Matile-Ferrero). Also another pest called the 'cassava green mite' (Mononychellus sp.) has caused crop losses. It was originally found on Ukerewe in 1972 - the first observation in Tanzania (IFAD, 2005). All these problems have reportedly affected farming on Ukara, too, but only the ACMV has been causing life-threatening shocks in the form of acute food shortages. According to my interviews, the most serious situations were experienced in 2009, but many farmers insist that the ACMV is still a problem that has not been yet solved.

The adoption of cassava is the most recent large-scale example of agricultural intensification on Ukara. The reasons for such measures on Ukara were rather clear: there was a need for a staple crop that could provide more calories more reliably than

millet. The more interesting question is why there has been no further intensification. According to Carswell (1997) intensification usually occurs as a result of a) increasing inputs leading to expanding outputs, without technological change; b) a shift towards more valuable outputs; and/or c) technical developments increasing land productivity.

There would definitely be room for such measures on Ukara, but I noted a strong unwillingness by the local farmers to intensify their cultivation through the use of chemical fertilisers, pesticides or machinery. For the majority of households these might be out of the question due to the high prices of such inputs compared to the low prices of the agricultural outputs. But in my opinion, their reluctance to use draught animals or even better tools on the fields is at least to some extent due to the cultural values attached to cultivation. Many of my interviewees stated clearly that this is the Kara method of farming and as such, one of the cornerstones of the local culture.

The local perceptions of cassava's importance and the challenges the farmers have been facing recently are focal to understanding agriculture on Ukara. Firstly, cassava is generally is drought-tolerant, but it anyhow requires more water to grow than sorghum (P11). On the other hand, too much water makes the roots rot. The local solution to challenge has been the ridging of the cassava fields in a careful manner, so that the falling rain water stays between the ridges, a method which aims at giving the plant just enough water. The preparation of the fields demands a lot of labour, and quite often this is left for the men of the household. (P2)

Cassava cultivation itself does not demand excessive amounts of time spent tilling and working on the fields, but the method of processing cassava after the harvest is highly labour-intensive. The ripe cassava tubers need to be peeled and pounded manually into flour with a simple wooden tool and then sun-dried in order to lover the cyanogen content. This is a time-consuming chore that needs to be done right after harvesting as the fresh roots deteriorate rapidly (Westby, 2002). This task is usually assigned to women and children (Bainbridge et al, 1998), which is confirmed by my questionnaire data. Three respondents (R51, R58, R81) stated that pounding cassava is girls and women's task, while none implied that men are doing it. In most households I observed the females, even young children, crushing the cassava roots into small pieces with a wooden tool. If this phase of processing is not done properly, the cyanogens may cause acute intoxication, vomiting, dizziness and can even lead to death (Westby, 2002; P1).

Especially older people I interviewed thought that the large-scale adoption of cassava has been problematic. One man of 54 years of age (P31) explained that in the 1950s his parents were mainly cultivating rice, millet and only some cassava, but little by little the ratio changed. He has inherited his parents' homestead, but suggested that the most important crops are now cassava, sweet potatoes and rice, in this order. He also cultivates some little maize and millet, because he feels that it is a necessary way of lowering the risk of hunger in times of crop failure. He feels that many people rely too much on cassava alone, which has caused hunger in his village as the cassava disease has led to major distress in many families. This is an evident critique of mono-cropping that has risen in popularity on Ukara over the past few decades. Crop diversification is can be a useful strategy to cope in face of potential risks, but as Mary and Majule (2009) point out, there can be social, financial, physiological and psychological barriers to taking such adaptation measures. According to my observations, some households on Ukara have taken steps towards crop diversification, even though the general pattern has been allocating more and more arable land to the cultivation of cassava.

Alongside with crop diversification, the local farmers reacted to the problem of cassava disease with two other sets of solutions. The most commonly taken decision has been to buy new, healthy cassava cuttings. Because people have grown to be suspicious about cuttings from Ukara, they have mainly been buying these from Ukerewe. The quality of these cuttings cannot always be guaranteed, and some claim that the cassava cuttings brought to Ukara from elsewhere are to blame for the spread of the disease in the first place. Hence, there is an urgent need for the local government officials to react and provide the local farmers with healthy planting materials. Another solution is a radical replacement of cassava by sorghum and millet, but this is has not so far been taken by many. Nonetheless, both the government agricultural officials (P11, P13) and some local farmers (P40) are advocating for the renaissance of these two cereals. One older person states that cassava has superseded sorghum and millet that have both been central precious for the Kara culture:

> "Traditionally sorghum has been culturally very important for the Kara people. It was our staple food that was eaten every day. Also home-made beer, brewed with bulrush millet, was a valuable part of cultural celebration. Nowadays both are difficult to get, because everyone is cultivating cassava." (P24, man, aged 75)

For many households it would not probably be viable to focus on solely on either sorghum or millet. Three reasons for this were mentioned in the data. Firstly, there are many grain-eating birds on Ukara that would severely harm the ripening cereals. The farmers feel that keeping the birds out of the fields would require disproportionate amounts of working hours (P19). Secondly, these cereals yield fewer calories per hectare than cassava. This calculation naturally relates to a situation where there is no crop failure due to cassava disease. Thirdly, cultivating grains allows for less flexibility in smoothing consumption in times of crisis. While cassava can be harvested early if needed, both sorghum and bulrush millet have more rigid harvest periods.

6.1.5 Accessing Cultivable Land on Ukara

The interaction between livelihoods and environment is most clearly demonstrated through patterns of land use (Soini 2006, p. 1). Accessing land is also an important determinant of any household's livelihood strategy on Ukara. The amount and quality of cultivable land in a household's possession guides its members' activities and the different livelihood options available to them. It needs to be noted that on Ukara land can be owned, rented and sold privately, which has not been a common practice in Tanzania[16]. According to my interviews, owning cultivable land has always been seen as a defining feature of a successful Kara household. Without a landholding, one must be particularly creative in creating enough income to survive. Traditionally landlessness has been a remarkable obstacle for escaping poverty, but currently the fishing sector is providing many landless young men an alternative option to sustain at least their personal livelihoods.

Barrett et al. (2001) note that when there are market imperfections related to buying, selling and hiring land - or hiring agricultural labour - , a household may not be able to take full advantage of the comparative advantage it possesses. They use the example of a blacksmith who is forced to spend his time in agriculture instead of working as a blacksmith, because he cannot hire labourers to his own fields at reasonable prices. On Ukara, some households do hire agricultural labour but this is rare, probably because the landholdings are so small that not much labour is needed. Some households, however,

[16] For instance, Koponen (1988, p. 273) states that in precolonial Tanganyika, the sale and mortgage of land has been relatively rare.

were forced to hire agricultural labour at certain times of the year due to the insufficient able-bodied male labour available within the household. Whether or not a household decides to hire wage labourers is hence wholly dependent on its own labour capacity, in other words, the ’human capital’ in its possession. Typically there is no full-time wage labourers on Ukara, but some households may allow for their men to sell their labour during times when they are not needed at their household’s own fields.

Djomo and Sikod (2012) have concluded that human capital, particularly the educational status of the household members and farming experience, were important in contributing to the efficiency of farming practices among agricultural households in Cameroon. But it has to be stated that based on my data, I can only assert that those households who cannot allocate enough labour to cultivating – especially during the process of preparing rice and cassava fields for cultivation – are prone to hire labour locally. Therefore some kind of market for hiring labour does exist, but I was not able to establish a clear wage level.

One Kerewe woman (P35), aged 34, who had married a Kara man made it clear that she must hire labour, because her husband is working outside of Ukara and she has five children, which restricts her from working on the fields herself. She stated that because she is not Kara, she has not have people on Ukara who would help her without getting paid. She is fortunate to have a husband providing her with enough cash to hire labour in a situation where she did not possess strong enough base of ’social capital’ or reciprocal networks to be able to ask someone to work her fields without payment.

A Kara man (P14) who is 30 years old and had moved to Nansio, Ukerewe to work as a SIM card salesman, explained that he works almost every day and can travel only twice a year to visit his parents who live on Ukara. He stated that because his parents are old and weak, he feels obligated to send them cash during the cultivation season, so that they can hire labourers to work with them on the fields.

As far as the question of renting or hiring land is concerned, I found out that sometimes households do rent land out, but usually only to some reliable members of their own kin. The biggest worry for people renting their fields out is that insufficient amounts of composted manure were used on their fields, which would lead to the soil losing its fertility. One government official (P37) working in Bwisya ward, said that in spite of having lived on Ukara since 2004, he has not been able to buy or hire land. He

explained that obtaining land is expensive in itself, but because of the low quality of soils, one most also buy cattle in order to get composted manure for the fields.

Selling land on Ukara is an even more complicated issue than hiring it. The land-owning households on Ukara are extremely wary of selling land, even in times of hardship, because on one hand land forms the most important kind of 'natural capital' that the typical Kara household can have. On the other hand, very few households on Ukara have extensive landholdings, and most households would put themselves in a highly vulnerable position through giving up land.

Cultivating land is the backbone of most households' food production, and looking for alternative activities can be difficult. Additionally, the cultural value attached to land is still great. A Kara man has traditionally been valued by his land ownings and his skills as a farmer. One informant (P8) told me that "…if a Kara man cannot provide enough food for his household, he will lose all respect in the eyes of the community". Another reason for not selling one's fields is the fact that it is so difficult to buy a new landholding. After selling land, it can be almost impossible to return to cultivation in the future. In his classic book *A Modern History of Tanganyika*, John Iliffe (1979, p. 461) remarks that unlike in most other places in the country, or even Sub-Saharan Africa, on Ukara land has been privately owned and sold for many generations but *only* to other Kara.

The process of selling land on Ukara is rather ambiguous, for the reason that landholdings are considered as one of the most important defining features of a lineage's identity. Most households or individuals looking to move out of Ukara, would rather hire someone within the same lineage to take care of their families while they are away, or rent their land out to a member of their lineage. The Kara are typically likely to take this type of temporary measures to make sure they can return if life in their new destination does not take off. Regarding these solutions, it is crucial to get a person with a good reputation to take care of the holding.

Nonetheless, there are cases when people come to the conclusion that the best - or only - solution available to them is to sell land permanently. In this case, the potential seller must first discuss the matter with his parents and respected members of his lineage, in order to find the most suitable buyer. There is an obligation to try to sell the land within one's lineage, which makes perfect sense, but can potentially be economically unviable

for the seller. One respondent (P2) established that because no widely accepted market mechanism exists in setting the price level, there is a tendency for the seller to get a minimal payment. In cases where agreement on the price for the holding cannot be found, the Village Executive Council (VEC) might be called to help in resolving the matter. If the piece of land is not sold within the lineage, the seller will declare the matter to the VEC, which will help in finding another buyer. When the price for the holding has been agreed, the seller has the responsibility to inform the local ward office of the deal.

6.1.6 Fragmentation of Landholdings

Fragmentation of landholdings was mentioned as a major source of stress and increased demand for agricultural labour on Ukara. Iliffe (1979, p. 460) describes how in densely-settled areas in Tanganyika, landholdings became highly fragmented partly because of the notion that a man is not considered a social being if he has no land.[17] Iliffe (ibid.) adds that in year 1934 land on Ukara had become so fragmented that ”the average Kara taxpayer owned fifteen plots of which some were only a few square meters”.

Eija Soini (2005) has studied the relationship between land use and livelihoods in the Chagga homeland, on the slopes of Kilimanjaro, which is considered a classic case of intensive farming system with very high population densities. Soini states that the fragmentation of landholdings has been one reason for the endangerment of cultivation as a sole livelihood strategy for local households. She notes that among her research participants, of those who had inherited land, as many as 47% had inherited less than 0.4ha and 21% less than 0.1ha. It is rather clear that no household can make a living with a farm that small. A similar trend can be found on Ukara, as more and more households must engage with non-farm opportunities for gaining subsistence and meeting adequate consumption levels. One of my interviewees (P33) decribed this phenomenon in the following manner:

[17] Here Iliffe (1979, p. 460) refers to the Chagga living on the slopes of Kilimanjaro, but very similar notions were voiced by my interview participants, although they noted that the respect towards agriculture and owning land is not as high as it used to be earlier.

> I know families who have, for instance, three small fields and many children. Obviously, the land available for inheritance will not be enough for all of their children. The most popular solution to this problem is to look for additional income from fishing if cultivation does not suffice to make a living. Some people have also started to brew home-made beer (’pombe’) and sell it on their yard. I know also some people who have moved out of Ukara because of land scarcity, but they are not that many.
> (Woman, aged 35, local government official)

Due to the dispersed nature of landholdings, it is a challenging task to measure a typical size of combined fields in a household’s use. The approximations given by my informants varied widely. A rather well-informed estimate was given by Ukerewe agricultural officer Samson Ibrahim (P13) and one extension worker located on Ukara (P50) who both claimed that the average size of one field is 0.2 hectares. Normally one household would have one to three such fields in their possession. According to the official government statistics, the average planted per household is 0.68 ha in Ukerewe district (Ministry of Agriculture, 2012), but it is likely to be distinctively smaller on Ukara than on Ukerewe. In the questionnaire data, it occurred to me that most respondents were not able to give a reliable approximation of the acreage of their households’ fields. However, the median acreage among the Ukara-born respondents was 0.5 hectares, which is likely to be a relatively accurate measure.

One man (P36), 66 years of age, elucidated that when the inherited land is not enough for the children to make ends meet, there are two different ways to resolve the situation. The first option is that the land is divided between the children and each of them tries to make a modest living and look for alternative sources of income if possible. The second option is that one or more children move out of Ukara and get a contribution of their share of land from those who stay. He added that he knows a number of people who have decided to move out. Even himself has invested in a plot of land on Ukerewe in 1995, because it was so much easier to buy an affordable, decent-sized farm there. Now his family lives on Ukerewe, but he himself farms the small plot he inherited on Ukara, while working as a housekeeper at a local guest house. This is a very typical example of how many households diversify both their activities and the types of their landholdings.

6.1.7 Conflicts Related to Land Ownership

It has become apparent that owning land on Ukara has always been important, for gaining both subsistence and status. But today there are probably more landless people on Ukara than ever before. This is mainly due to the rather positive fact that nowadays it is well possible to make a living despite not being able to own or even access a landholding. However, there is a certain division between those who are able to cultivate land and those who are not. In the following paragraphs I will explain some root causes for the conflicts relating to land.

> "Most conflicts on Ukara are related to land ownership.
> The population has grown, there is not enough cultivable land for everyone."
> (Josefu Mkundi, Chairperson of Ukerewe District Council)

The quotation above further underlines the importance of the question of accessing land on Ukara. The problem has probably existed for decades, even centuries, but based on my interviews, it is evident that the struggles over land have accentuated since the rapid population growth began in the late 1970s. Because land is such an important cornerstone of a household's well-being and one measure of a Kara man's social status, it is not uncommon for even violent conflicts to arise between local families, and particularly between household members in times of inheritance. In the following paragraphs I will give a concise overview of some rather typical cases of land conflicts on the island. First of all, I will explain how and why such antagonisms arise during times of inheritance. Secondly, I will proceed to illustrate why there has been some serious disagreements between farmers and fishermen on Ukara.

When discussing the conflicts that occur between members of the same household, it has to be remarked that the majority of such incidents happen in times of inheritance. The method of dividing land between children following the death of their parents varies slightly among families and between different lineages on Ukara. According to the Tanzanian law, daughters should inherit their parents' land, but the empirical fact is that in many locations especially in rural areas, the customary law still leaves the daughters without a right to inherit land from their parents (Tsikata 2003, p. 156). As Sheridan (2004) points out on the case of North Pare, women customarily gain access to land through kin relation or marriage, in spite of the high level of their contributions to household food production. Similarly, Issa G. Shivji (1998) has remarked the problem

for women has not been one of accessing land, but rather one of controlling and owning land, because upon marriage the women actually assume the primary responsibility for taking care of her husband's cultivations. Nonetheless, this practice leaves many unmarried and widowed women in very insecure situations.

On Ukara, it is still common that daughters do not inherit their parents. One male informant (P40) of 39 years of age, belonging to a highly influential lineage, stated that in their household girls can only inherit if the parents have no sons or if she is divorced or widowed and cannot access his husband's land anymore. He was well informed about the fact that the Tanzanian legislation guarantees a share of inheritance for daughters, but commented that he does not know any lineages on Ukara, where daughters had a predetermined right to inherit. Another male respondent (P24) of 30 years of age contrasted this view by saying that in his lineage daughters can also marry, but that he understands that they can be in a better position that sons if they can access land through their husband and through their parents. This notion is tightly linked to the commonly held view that in marriage a woman will become a member of his husband's lineage and cease to have rights to her parents' property.

It is not possible to draw a clear-cut model how of the deceased parents' ownings are divided between the heirs. According to Soini (2006, p. 18), in the Chagga culture of Kilimanjaro, the eldest son has been the principal heir, and the youngest son the next favoured. It occurred to me that on Ukara it varies between lineages, which of the children is favoured in inheritance. One man (P23) of 29 years of age was certain that he will inherit his parents homestead, because he is the *youngest* son and within his lineage the youngest son has the responsibility to take care of the parents until they pass away. He explained that all of his three elder brothers have already moved away from the household and been given their share of household's land when they married. But he himself is not allowed to move out at this point.

This narrative was confirmed by another respondent, a man (P30) aged 23, who was also living in a similar situation. His father had passed away, but he had to stay with his mother and support her in farming. Interestingly, he said that he has no control of the farming decisions, as he must obey the commands given by her mother. However, one respondent (P14) claimed with confidence that traditionally the eldest son has been favoured in Kara culture, but that currently most parents ponder carefully, which of the sons is the most responsible to take care of their homestead and the key land

endowments attached to it. He added that this custom changed because not all of the principal heirs took care of respecting their siblings' rights and needs after inheritance.

In accordance with this view, an older man (P31) of 54 years of age, recounted that he was surprised by the decision taken by his father that he was to be the *responsible one* who would inherit his parents' farm:"My father took me to visit Mwanza in 1992, and it was during this trip when explained to me that he wants me to take care of himself, my mother and the household's farm when they are old." He also emphasised that he was not forced to stay, but that after this event he has never considered leaving Ukara.

A couple of days earlier I had interviewed this man's younger brother (P20), aged 50, who had inherited a much less fertile piece of land. He did not imply that he had been bitter towards his brother for being given the better landholding, but he explained that if he was to make a living on Ukara, he was forced to obtain a bigger piece of land. How he resolved this situation is worth describing here. He reported that in 1990 it was time for him to marry and move out from his parents' homestead. As he had not enough money, he decided to just grab a piece of land along the shore of the north-eastern coast of Ukara. He explained that the plot had been abandoned, because the original owners thought that the land was completely infertile. He, however, was persistent and having carefully worked the land he was able to reap a decent harvest of cassava and maize. Following this, he had built a house on this plot and has now raised eight children there. Nevertheless, he said that he has been constantly harassed by the original owners of the land who want to get compensated and by the fishermen who have kept insisting that the house has been illegally built on the protected zone next to the lakeshore. He has remained firm and refused to pay anything.

The example given above is a typical case of a land-related conflict on Ukara. According to the Tanzanian legislation, the fishermen are able to settle and build temporary huts on the 50-metre wide protected zone[18] on the shore of any island on Lake Victoria. According to an interviewee (P10) at the Regional Fisheries office in Mwanza, the fishermen are free to move to any island on the lake, as long as they have paid the appropriate licences. The licencing procedure, however, is not restricted, and anyone applying for the license will receive it. This open-access model of the fishery of

[18] I have not been able to confirm the exact width of the protected zone as required by the law. One local government official (P15) claimed that it is 60 metres, whereas one boat owner (P18) said it is 30 metres. This goes to highlight the fact that differing views among the stakeholders are common.

Lake Victoria has been criticised by both the local inhabitants and environmentalists, as it is contributing to the diminishing fish stocks and to the overcrowding of the popular fish landing sites. (Ntiba et al. 2001, p. 213) On Ukara, even more specifically, the problem of land scarcity has led to many local farmers extensifying their cultivation to the protected zones, which has caused anger among the fishermen. At the same time, many Kara farmers have claimed that the fishermen are cultivating on the protected lake shores, too. In any case it seems that violations of the protected zone are a common reason for disputes between the farmers and the fishermen. This issue was explained by one local government official (P15) in the following way:

> There has been some disputes between the local population and the fishermen who have come from elsewhere. In Nyamanga village, the farmers chased one fishing camp away last year, because its fishermen had started cultivated near the lakeshore…
> …There has also been physical violence and fighting among these groups, but not in Bwisya during the time when I have been working here. But in other areas on Ukara there has been some serious cases of violence, even killings. Last year four people were killed.
> (Man, aged 40, local government official, P15)

The rising levels of insecurity and crime on Ukara were voiced as a troubling concern for many of my research participants, and most often in-migration was mentioned as the most important cause leading to these. The local population has been annoyed by the free and reckless lifestyle of the fishing camps, where young men originating from many different parts of East Africa live in unhealthy conditions and desperately struggle for survival. One respondent (P26) indicated that the security situation is particularly bad in Bwisya village, where the teacher's house of the local school was robbed by bandits in January 2013 and one woman was raped in December 2012. The criminals had not been caught yet, but most local people believed that they must have been fishermen hopelessly looking for cash to remit to their families. Another man (P20), aged 50, said that he views the rising crime rates as an outside influence, because when he was younger there was never any crime on the island. He strongly implied that the insecurity has been caused by the non-Kara fishermen, but admitted that nowadays there are also many Kara who resort to robberies because they are desperate and have been influenced by the outsiders. It is not possible or necessary for me to decide whether this is true, but it is both alarming and interesting that so many local people are putting the blame to the fishermen who have come to Ukara from elsewhere. In any case, this sheds

light to the phenomenon of the social divisions, conflicting interests and rather deep suspicion between the Kara and the non-Kara living on the island. Finally, it has to be noted that such viewpoints are not shared by all of the informants.

6.2 Fishing on Ukara Island and Lake Victoria

While crop cultivation has always been the backbone of the Kara economy and main source of subsistence on Ukara, the commercial fishery on Lake Victoria has heavily affected the local households' livelihoods since the 1980s. During his fieldwork in the 1960s, Ludwig observed that "Fishing plays only a minor part in the economy of Ukara… Only a few Wakara pursue fishing, and then very irregularly" (Ludwig, 1968, p. 125). This account has become very much outdated. According to my analysis, understanding the development of this large-scale, open-access fishery, is key to explaining the rapid population growth on Ukara. The economic opportunities available for young men in the fishing camps have absorbed the local households' surplus labour. They are working mainly as crew members in fishing boats, while women and children are occupied with processing of the catch, especially drying of the silver cyprinid. Simultaneously, following the substantial influx of migrant fisherfolks to Ukara, many Kara households have been able to benefit from the enhanced market access for their own agriculture products and other services. In this chapter, I will give a brief outline of the Lake Victoria fishery and explain the characteristics of the fishing of the two most commercially valuable species: the Nile perch and the silver cyprinid.

6.2.1 Overview of the Fishery

Lake Victoria is the world's largest tropical lake, with a surface area of 68,800 km^2. It is shared by Tanzania (controlling 49% of the lake surface), Uganda (45%) and Kenya (6%). According to some estimates, the lake catchment provides livelihood for as many as 30 million people in the three sharing countries (Canter & Ndegwa, 2002, p. 44). The scale of the fishing industry on Lake Victoria is enormous. In 1983 there were an estimated 12 000 fishing boats on the lake in all the three countries combined (Geheb et al., 2008, p. 87). In early 2006, there were a total of 56,321 fishermen with 16,911 fishing boats/canoes in the Mwanza Region alone (Mwanza Regional Commissioner's

Office 2008). Principal fish caught are the Nile perch (*Lates niloticus*, 'sangara' in Swahili) and the silver cyprinid (*Rastrineobola argentea*, 'dagaa'). Other common species include the Nile tilapia (*Oreochromis niloticus*, 'sato'), haplochromis cichlids (locally 'furu'), African lungfish (*Protopterus aethiopicus*) and the large catfish (*Bagrus docmac*). The fisheries are valuable for the local economy in creating employment to the rural areas and thus reducing rural-urban migration. Fish also provides an important source of protein to the local people's nutrition. (Abila et al. 2005.)

Fishing and fish trading is by far the most profitable economic activity on Ukara Island. However, this has not been the case for a long time. The development of a large-scale fishing industry on Lake Victoria is a rather recent phenomenon. Traditionally the Kara have been agricultural people, but the cultural respect given to cultivating land has been eroding due to the higher profits derived from fishing. Especially many young Kara men are looking for employment in the numerous fishing landing sites situated along the eastern and northern shores of the island.

In spite of the importance of the fishing industry, there are many practical problems related to it, making its sustainability as a livelihood questionable. One concern is overfishing, which is a typical problem in most open-access fisheries in poor countries. According to Pomeroy (2012, p. 521), this is mainly due to *overcapacity*, which means that there are excessive levels of capacity over the long term in relation to some target level of yield or capital (boats, gears, and fishers) used in the fishery. The Lake Victoria fishery has attracted thousands of young men from different parts of Tanzania, mainly rural areas, in search for income-generating opportunities. Most of these migrant fishermen are completely dependent on the income derived from fishing and possibly some minor non-farm income and are, as observed by Perret (2014, p. 1219) in South-East Asia, generally poorer than members local farming households deriving some additional income from fishing.

Another problem is related to the way the profits are being shared amongst the players. The value chain has been constructed so that customarily the individual fisherman's wages remain very low. The boat owners, middlemen, fishmongers and ultimately the predominantly foreign-owned fish factories reap great majority of the benefits, while the actual labourers – the fishermen – are left with very little. This is especially problematic because they are the ones who carry the biggest security risks. If the fishermen earned more, the fishery would also be much more efficient in reducing poverty in the region.

These high disparities in earnings also create tensions and a sense of injustice among the parties involved in the business. (Abila et al. 2005) I will explore the local economics of fishing on Ukara in more detail in the following chapters.

Each of the fish species has their own distinct markets and processing chains. The Nile perch is by far the most expensive of the species in Lake Victoria, as it is mainly being transported to Europe and Asia for consumption. The Nile perch is being processed into fillets in the fish factories located on the mainland near Mwanza. (Regional Commissioner's Office 2008, pp. 78–79) The trade in the silver cyprinid, for its part, is mainly regional. The silver cyprinid is a tiny sardine-like fish, approximately 40mm long at maturity, which is easily dried on the shores by the fishermen or women and children working on the landing sites. Traditionally the silver cyprinid has been caught only for local consumption, but recently there has been a growing demand for it in other parts of Tanzania and even neighbouring countries such as Zambia, DR Congo and Burundi. It is used for both human and animal consumption. At present, the silver cyprinid is even more important than the Nile perch, as far as local employment opportunities are being concerned. The fishing of Nile tilapia used to be an important source of income for the local fishermen, but currently its stock in the lake is too low to sustain commercial fishing.

6.2.2 The Nile Perch - a Predator or a Resource?

From an ecological viewpoint, Lake Victoria has often been referred to as prime example of a man-made disaster in the form of a major loss of biodiversity. There used to be an abundance of different types of fish fauna in the lake in the early 20th century, including more than 300 species of haplochromine cichlids alone, 99% of them endemic (Ogutu-Ohwayo 1990, p. 702) But already by the 1950s and 1960s, there was evidence that many of the large species were overexploited due to growth in fisheries and the introduction of new fishing technologies. For the British colonial government the main problem was that the haplochromis was not an ideal type of fish for commercial fishing. (Geheb et al, 2008, p. 85.) During this period, in 1954, the Nile perch – a large and meaty fish – was introduced to compensate for depleting fisheries by bringing a high-value species that was easy to catch to the lake. (Balirwa et al. 2003, p. 705–707) A drastic loss of diversity in the lake occurred, as the Nile perches grew much bigger than

anywhere else, even up to 200 kg, while preying on the smaller fish. By the mid-1970s the haplochromis' contribution to the lake's fish biomass had fallen from 90% to 1%. (Geheb et al, 2008, p. 86)

Nonetheless, it has been noted that the idea of the introduction of the Nile perch as the only reason for the ecological catastrophe is oversimplified, as pollution, environmental degradation and the widespread use of illegal fishing methods have heavily contributed to the problem (Manyala & Ojuok, 2007, p. 413). Already in the 1940s and 1950s the colonial administration had intensified fishing on the lake by reorganising the fishery into fleets which relied on hired labour, thus undermining the traditional modes of fishing and local enterprise (Geheb et al., 2008). Verschuren et al. (2002) have shown that the growth of the human population and agricultural activities along the Lake Victoria drainage basin contributed to the rising levels of phytoplankton production since the 1930s, which led to the loss of deep-water oxygen from the early 1960s onwards and was one major reason behind the loss of deep-water cichlids[19]. Hence, it can be stated that the actions of people have had a direct – if not always intended – impact on the lake's fish stock, but similarly the changing availability of certain fish species has directly affected the socioeconomic situation and livelihoods of the people dependent on fishing (Everson et al. 2012, p. 65). The contribution of Lake Victoria fisheries to Tanzanian GDP was as high as 1.8% in 1998 (Lokina, 2008, p. 497) Eventually it can be noted that in case the Nile perch had not been introduced at all, the lake might not have ever succeeded in becoming the economic powerhouse it is today. The fishery has, after all, generated employment for fishermen, transporters, fish processors and factory workers (Geheb et al., 2008). There is a conflict between the short-term needs of the human population and the long-term sustainability ecosystem. Nevertheless, unless the fishing activities are regulated and controlled efficiently, there will be a severe fish stock depletion which is definitely going to damage the local livelihoods in the long run (Lokina, 2008, p. 514).

[19] Rijssel & Witte (2013) explain that some of the haplochromine cichlid species that survived extinction went through some remarkable morphological responses that were initiated by predation, eutrophication and a diet shift. In their view, predation was the most important of these factors.

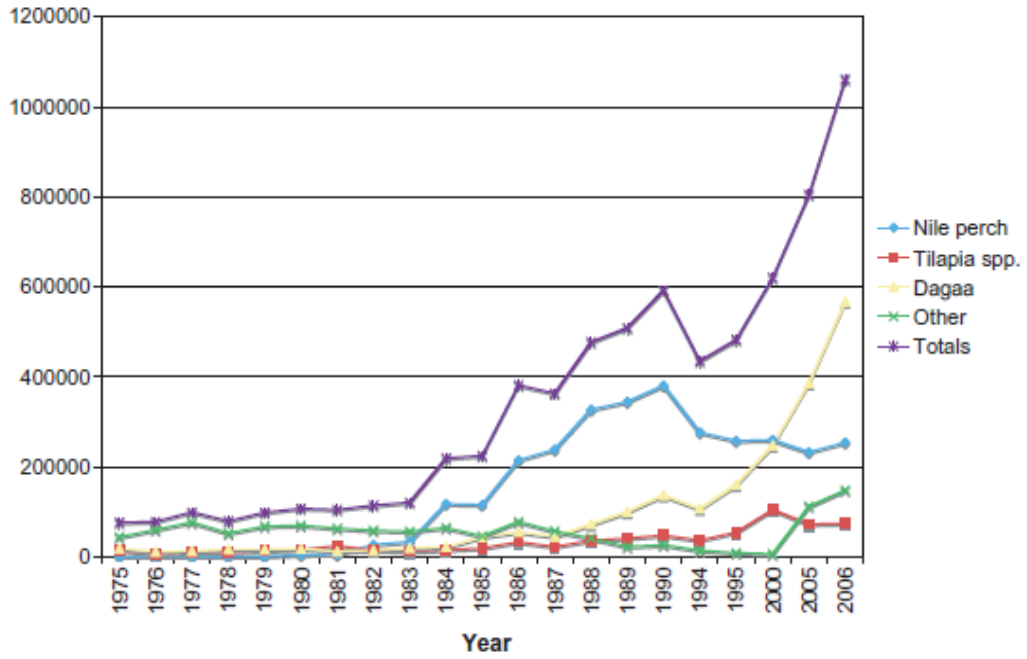

Figure 4: Fish landings from Lake Victoria for selected years, 1975–2006
Source: Geheb et al., 2008, p.86

The fish landings of the Nile perch grew steadily during the 1980s and peaked in 1990. However, the over-fishing of this species has led to its decline (Fig. 3). Despite the fact that the levels of fishing effort of the Nile perch have risen, the levels of landings seem to have stagnated, even declined, since the early 1990s. This implies that, on average, the catch size per fishing boat has fallen dramatically. Between years 2001 and 2003 the standing stock of the Nile perch reduced by 50%. This has – perhaps surprisingly – led to the renaissance of other types of fish in the lake, even some of which had been thought to become extinct. (Balirwa et al., 2003, p. 705–710) But in the long run the main beneficent of the diminishing numbers of the haplochromis in Lake Victoria has been the silver cyprinid, which was small and fast enough to survive in large numbers even when the Nile perch population was at its zenith.

6.2.3 The Value Chain of Nile Perch: Exploiting the Fishermen

The Nile perch is definitely the most important export product on Ukara, but due to the nature of the global economy, the fishermen get only a very small share of the final value of the exported fish. During my fieldwork, the crew members were selling their fish to the traders for approximately 2500 TSH per kg of fresh Nile perch, with

variations between 2000 - 3000 TSH depending on the size of the fish (P18). I witnessed some Kara men having set up their own transportation business, but without enough capital available for investing in ice tanks and motorboats, they were forced to resort to transporting dried Nile perch to Ukerewe, Mwanza and Musoma with slow sailing boats. In the Nile perch business the lucrative benefits are reaped by those who can provide a constant flow of fresh fish to the big fish processing factories. Because dried Nile perch is only consumed locally, its prices are much lower than that of the fresh fish sold to the factories to process them into fillets for export markets.

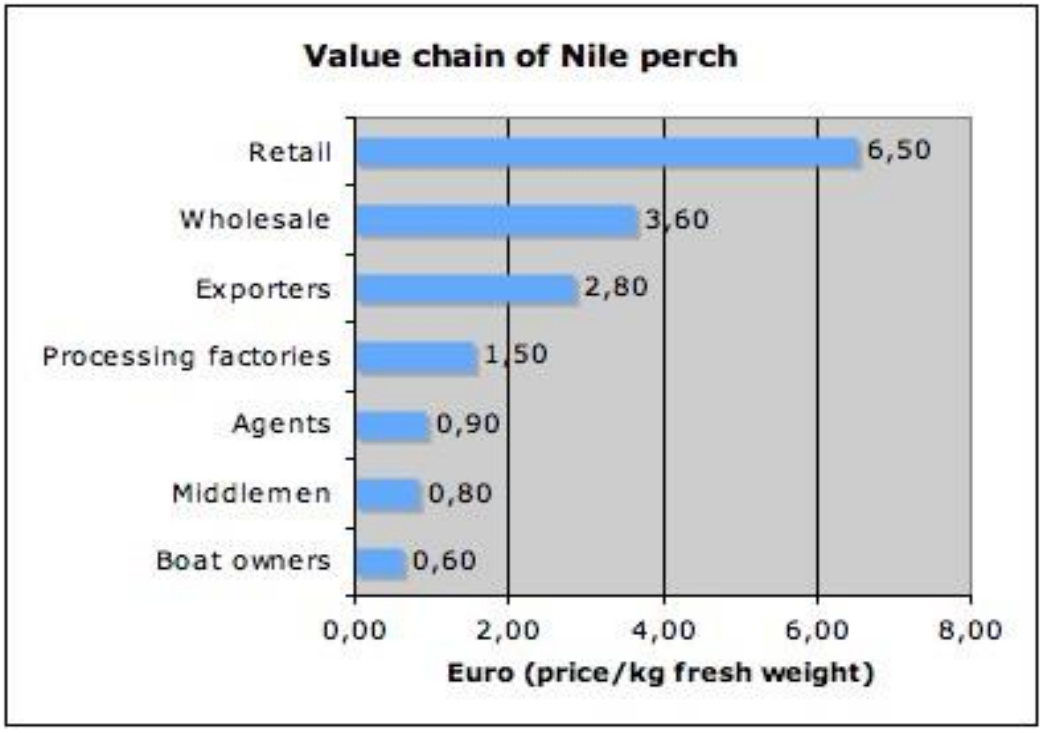

Figure 5: Value chain of Nile perch from boat owners on Lake Victoria to retailers in Europe. Source: van der Knaap & Ligtvoet (2010, p. 433)

Figure 5 presents the value chain of exported Nile perch. It is apparent that the players nearer to the European consumer are sharing the majority of the profits. According to the estimation by van der Knaap and Ligtvoet (2010, p. 433), less than 4% of the value of the final product remains with the people responsible for the actual fishing activity. For some reason they have not separated the fishermen's share from the boat owners' share in their graph, but according to my data, the individual fisherman will actually get only one sixth of the amount allocated to the boat owners in Figure 5. As I will explain

in the following paragraph, in Tanzania the normal practice is that the three crew members working in each boat give 50% of the value of their catch to the boat owner and share the rest between themselves. If we compare this estimate with the statistics given in Figure 5, a fisherman would eventually be paid only 0.6% of the value of the end product. This figure is extremely low, and one of my informants described the situation as follows:

> "Many young men have switched from cultivating their family fields to working in the fishing camps. At the moment, the availability of labour in the fishing industry is huge. The boat owners are reaping the benefits of the young men's labour. It is easy for the capitalists to run their business and keep the wages low."
> (Man, 41 years old, teacher. P44)

One Kerewe fisherman (P45, aged 31) living in Bwisya village, Ukara communicated that the fishing camps targeting Nile perch are ethnically diverse and fishermen arrive from different parts of Tanzania, because it is available all year round. In his view, those fishing silver cyprinid can harvest good catches over one or two months, but after that they usually return to their homesteads. He explained that in during the period of my fieldwork, in January and February, one boat would be lucky to catch 30 kg of Nile perch per day. They sell the fresh fish to the fish traders on the beach for 2000 TSH per kg of fresh fish. The daily income per boat adds up to 60 000 TSH, but this is only the gross income. First they deduct the costs of the foodstuffs, firewood, equipment and their share of the wages for the fishing camp's cooks. Customarily there are two women cooking for 20 to 30 fishermen. After these deductions the boat owner will keep half of the remaining sum and divide the rest between the three crew members. They are normally hired on short-term contracts, lasting from two to three months. If the crew cannot catch enough fish to keep the boat owner satisfied, it is easy for him to find willing applicants to replace the old crew.

Figure 6: Non-Kara fishermen mending their Nile perch nets during early afternoon in a fishing camp near Chifule village.
Photo by Tomi Lounio

The crew member's share of the net income is small, but it may still add up to being a relatively meaningful amount of money in the cash-stricken environment. Allison and Seeley (2004) note that even though the fishermen are not wealthy, they may still have much more cash available than the local farming population. This is one reason explaining why these young men choose to take the risk of going to the lake every day. The remittance money sent home by the migrant fishermen can form a valuable part of their respective households' income portfolios, even though the total sums are likely to be small (P13, P21). But this obligation can be in stark contrast between the individual fishermen's personal aspirations. An important reason for the fishermen I interviewed to stay in the fishing camp was to fulfil the dream of being lucky in getting a big catch from which they could derive enough wage money to buy their own fishing boat or a shop. One young man (P5, aged 16) told me that he wants to save money to pay for his secondary school fees, whereas another one (P6, aged 23) was saving to go to college. It was surprisingly clear for the fishermen that the work they are doing is merely a means to obtain enough cash to be invested elsewhere. This is clearly an option that would not be viable through subsistence crop cultivation on Ukara.

Regarding the institutional context of fishing on Lake Victoria, it has to be noted that the fishermen and obliged to become members of the Beach Management Units (BMUs), which were originally initiated to become legally empowered, community-based units aiming at safeguarding the rights of the people living in the fishing camps. The members include everyone included sharing the same landing sites, e.g. boat owners, crew members, traders, processors, boat makers, net weavers and so on. (LVOF, 2013b) The BMUs, however, have failed to find legitimacy among the fishermen. (P12) According one local fisherman (P49), 28 years of age, the BMUs are considered as inefficient, corrupt and unable to provide the basic services like sanitation and credit facilities. The aim of such local-level decision-making units is admirable, but it seems that the BMUs have very limited resources and the key stakeholders appear to have highly diverging interests. Unless the fishermen are able to form stronger pressure groups or labour unions, they are likely to be exploited in the future, too.

Another challenge is the monitoring and controlling the Lake Victoria fishing activities, namely the use of illegal gear, methods or fishing in protected areas. The illegal gear includes monofilament nets, undersized gillnets, drift nets and beach seines[20], while the banned methods include capturing undersized fish[21] and the use of chemicals, for instance (P10). One fisherman (P45, age 31), however, was of the opinion that especially during the low season it would be futile for anyone to try to survive by using the legal methods only. He stated clearly that he himself is a well-known net weaver and that the demand for poison-treated Nile perch is constantly growing. "When the fish touch my net, they die", he added, but insisted that no harm is caused to humans eating such fish. This view is not shared by all, and cases including diarrhea, vomiting and pneumonia have been reported (Daily News, 1999)[22].

Reardon et al.'s (2001, p. 396) afore-mentioned notion that the growing rural non-farm employment (RNFE) does not necessarily imply a proportionate increase in rural non-farm incomes (RNFI), applies particularly well to the fishing industry, where the ordinary crewmen often choose to stay in the fishing camps, even when the salaries are almost non-existent. According to one boat-owner I interviewed (P18), many fishermen have been willing to work for him even during the quieter months, when the monthly

[20] The legal gillnet size is 6 inch for Nile perch and tilapia, 10mm for silver cyprinid (LVOF, 2013).
[21] The slot size for Nile perch is 50 to 85 cm, and for tilapia the minimum size is 25 cm (LVOF, 2013).
[22] In March 1999, the EU imposed a ban on all fish imports from Lake Victoria, following reports that alarming rates of pesticides were found in Nile perch samples. The ban was lifted two months later. (Mosha & Magoma, 2002)

pay can be as low as 3000 TSH, an equivalent of 2 USD. He reiterated that the excessive labour supply is due to the land shortages felt on both Ukara and Ukerewe.

The living conditions in the fishing camps are very low, and first-time visitor like myself it was initially difficult to understand, why so many young men rather choose to live in such an unhealthy environment, doing dangerous and unpredictable work for very little pay. But these seemingly non-rational, decisions can be explained through some particular 'push' and 'pull' factors. The push factor is evident in times of food shortages within the sending household, as it is in its interests to send out surplus labour to the fishing camps, where food is normally provided for the workers. (Beuving, 2010). Wiggins (2000, p. 636) has interestingly noted that in Nigeria, systems of intensive agriculture are evidenced to provoke young men's out-migration, because the labour demands of composting manure and carrying it to the fields is simply daunting. The pull factors include the socio-cultural notion of young men enjoying life at the camps, where they are free from the gerontocratic decision-making patterns of their home communities, and on the other hand can enjoy many types of entertainment opportunities, such as pool tables, bars and video halls. Another pull factor is an economic one, namely the idea that there might be better times ahead and it is not worth risking one's social capital and connections by returning home to cultivate land. (Beuving, 2010.)

6.2.4 Commercialisation of the Silver Cyprinid Fishery

As can be seen in the fish landing statistics (Fig. 5), the silver cyprinid has been the most commonly caught species in the lake since early 2000s. This is due to the growing markets for the silver cyprinid in the region and the fisheries' response to this through switching from targeting the Nile perch to the silver cyprinid. It is not very well understood why the demand of the silver cyprinid has risen especially in Tanzania, but this has been explained to be a by-product of urbanisation and the migration flows from the Lake region to other parts of the country. The migrants who have become accustomed to eating this particular type of meal have been willing to consume it while living in the cities, too. The population of the city of Mwanza has grown quickly from 170,000 inhabitants in 1988 to more than 700,000 inhabitants in 2012, which has had a direct impact on the demand for affordable fish. Another explanation has been that in

times of price hikes for other sources of protein, the dried silver cyprinid has become the preferred alternative for many poorer households. Furthermore, the species is also widely used in the production of poultry fodder.

On Ukara, each boat targeting silver cyprinid has a crew of five men. A wealthy boat owner tends to own at least three boats, but I heard stories of some Kerewe men owning as many as 20 boats. Quite often the owner aims at spreading risk by sending some boats of his fleets to work on other islands. One boat owner, a Kerewe man (P18), working in the south-eastern part of Ukara, explained that the fish must be dried on the beach for nine hours before it is ready for transportation. Paradoxically, the availability of the silver cyprinid is highest during the rainy season, but the wet conditions make the drying process impossible.

> "Normally we leave the camp at 7 pm and go far out to the lake. We sleep for a few hours in the boat near some smaller islands. This is hard work. We come back to our home camp at 6 am. Then we have to start drying the fish immediately. The fish is ready by 5 pm, and then we load it into big sacks. After that we return to the lake."
> (Man, 30 years old, fisherman. P21)

The fishermen go fishing during night-time and they attract the silver cyprinid with kerosene lamps. During full moon this strategy does not work because there is too much light, and normally the fishermen work in the camps for three weeks in a row and have one week off during the brightest lunar phase. Many of the fishermen (P21, P23) complain that they are extremely tired, because during the three-week working cycle they constantly get to sleep insufficient hours. One fisherman (P45) said that fishing silver cyprinid is much harder work than fishing Nile perch, owing to the differences in working hours.

Figure 7: Temporary huts of the Kara fishermen working in the silver cyprinid fishery. Photo by Tomi Lounio

The phenomenon of many Kara households having almost all of their male labour allocated to working in the fishing camps is very recent. A Kara woman (P25), aged 71, from Bukiko village recounted that before the late 1950s Kara men participated in fishing rarely and reluctantly. Another interviewee (P2) explicated that up until the late 1990s it was already common for Kara men to fish silver cyprinid, but only seasonally and mainly for own consumption. However, today many young Kara, typically aged between 18 and 35 years, are engaged in the fishing sector throughout the year.

The Kerewe boat owner (P18), aged 45, had initially moved to Ukara in year 1980 when he was just 15 years old. He expounded that he had followed his father who had noticed that the fishing sites are better on Ukara than on Ukerewe. He did not want to become a fisherman himself, but wanted to study instead. Nevertheless, having graduated and saved some money through working in Mwanza, he decided to invest in his own fishing camp on Ukara in 2003. He proudly explained that he was among the first large-scale boat owners targeting the silver cyprinid. For many years his business developed smoothly and he was able to build a house in the city of Mwanza. He further explained that in his camp the fishermen and responsible for drying the fish and selling it to the fish traders. The dried fish is sold by can (‘*debe*’ in Swahili) of approximately four

kilograms each. One can is worth 6000 to 7000 TSH, i.e. 1500 to 2000 TSH per kg. Over the past two years the diminishing availability of fish, increasing competition and the rising prices for fuel and kerosene have, however, made him wonder whether the business will ever be as lucrative as it used to be.

What has to be underlined, however, is the fact that it is not necessarily easy or even possible for the fishermen to switch from one target species to another. The Kara have been largely marginalised from the profits available from the fishing of the Nile perch, due to both economic and cultural reasons. Firstly, the local people did not initially possess enough capital to fully benefit from the Nile perch boom. The Kara were not able to buy boats and equipment, but instead the boat owners and traders came from other parts of the lake, or from elsewhere in Tanzania. Secondly, the choice to fish the Nile perch or the silver cyprinid is to a large extent determined culturally and is also dependent on the skills of the fishermen and the equipment available to them. The Kara have traditionally been only involved in the fishing of the silver cyprinid, and mainly for subsistence consumption only. This has been gradually changing, but according to my observations, the vast majority of those fishing the Nile perch on Ukara come from elsewhere.

It can be stated that the commercialisation of the fishing of the silver cyprinid is rather well compatible with the Kara culture, in spite of the desolate living conditions of the fishing camps being despised by the local elders. The fisherfolks residing in the camps are living without the most basic health services and sanitation (Tumwesigye et al., 2012). Also HIV/AIDS prevalence rates among the mobile fishermen are significantly higher than in the stationary rural populations, as prostitution and risky sexual behaviour are rife in the camps (Mojola, 2011). The economic activities available in the fishing camps are highly engendered. According to my research participants, they had never heard of a woman who was engaged in fishing. For the women living in the camps, accessing fish is quite only possible through petty trade or transactional sex. The local brothels are central points of the fishing camps that I visited. But few of the women engaged in prostitution are doing it full-time. According to one younger man (P30), aged 23, the normal cost of visit to a brothel is just 5000 TSH, which equals 3,13 USD. Instead, the women are typically also cooking for the fishermen and participating in fish processing. While the attitudes towards prostitution seemed somewhat lenient, I was being told that the Kara women active in prostitution would be more likely to travel

elsewhere, because the social stigma within the community would be too much to bear (P33). However, two local teachers (P26, P44) reported that they are worried because young schoolgirls living within close proximity to the fishing camps are being constantly sexually harassed.

Currently the growing trade in the silver cyprinid is allowing the boat-owning Kara to accumulate wealth and the young Kara fishermen to find employment. Participating in the silver cyprinid fishery is less capital-intensive in comparison to fishing the Nile perch. This is due to the easier availability of the former species, which implies that buying engines for boats is not a must. However, all the more successful crews seemed to be using outboard engines, which allow them to follow the fish further to the lake. It seems that among the wealthier sphere of the Kara, buying more and more boats is actually considered as an ideal investment. This is strongly related to the fact that arable land is not easily available on the island, although many opt to buy land on Ukerewe or on the mainland. Beuving (2010) explains that at least in the Ugandan part of the lake, the local credit facilities accept fishing boats as appropriate collateral when handing out loans. Furthermore, owning more boats is wiser as there is a vivid market for boat rentals, which makes buying a boat a rather risk-free investment. In the analysis chapter, I am going to inspect the local fishing industry in more detail, with a focus on its role as a component in the local livelihood strategies. I will also argue that the growth of the fishing business is probably the most important factor affecting the social and economic development of Ukara today.

6.3 Analysis of Livelihoods on Ukara through Case Studies

I the previous chapter, I explained the main characteristics of agriculture and fishing on Ukara. The key question remains, however, and it is about how the local households choose to combine these and other activities in their livelihood portfolios. In conceptualising these processes, I will utilise the framework for analysing rural livelihoods presented in chapter 3.1. I will not pay equal attention to all the aspects of the framework, as particularly little reliable information is available about financial capital, and I am not attempting to include a thorough examination of policies and institutions on Ukara, this being beyond the scope of my study. Instead, I will focus on the most relevant issues of the local livelihood strategies that I was able to cover during

the data collection phase. In this chapter, my aim is to answer my second and third research questions. Firstly, how and why have the households on Ukara modified their livelihood strategies in the changing social, economic and ecological environment. And secondly, how have these modifications in the local livelihood strategies contributed to the rapid rise in population densities on Ukara since the 1970s.

6.3.1 Outline of the Vulnerability Context

In analysing the process of households construct their livelihood portfolios on Ukara, we must begin with clarifying the vulnerability context. This is the part of the social and natural setting that affects the rural people but is outside their control. As explained in chapter 3.1, the vulnerability context covers the trends, shocks and seasonalities that have direct consequences for the ways the households gain subsistence. I will look at these in the following couple of paragraphs. It needs to be noted that my aim is not to produce an exhaustive list of all possible factors, but rather outline the most important ones as mentioned by my informants.

The most important trends affecting livelihoods on Ukara have been described in chapters 5 and 6. Most importantly, population on the island is growing rapidly and the rising number of migrant workers and entrepreneurs is altering the dynamics of production and trade. Competition over natural resources has been tightening steadily as there are more people trying to access cultivable land and the Lake Victoria fish stocks. It is also questionable, whether the soil quality has diminished or not, but some interviewees (P15) stated clearly that it is an issue affecting the harvests. The soils on Ukara are extremely fragile, and the farming households are careful in conserving their fields' fertility. Political competition has been heating up nationally and locally, and Ukerewe district has emerged as one of the major strongholds of the opposition party Chadema. According my key informants (P1, P2) this has led to the ruling party CCM trying to suppress government funding on Ukerewe and Ukara, a view strictly refuted by a local CCM activist (P31). During the fieldwork there was an on-going court case against the Member of Parliament for Ukerewe, Salvatory Machemli (Chadema), for inciting hatred amongst his supporters towards the police and CCM members in Nyamanga village, Ukara. There is a reason to assume that certain tensions exist, but

Machemli was eventually cleared of charges in June 2014, in spite of three local policemen having testified against him (Tanzania Daima 2014).

As far as global technological trends are concerned, there has been some rapid development in mobile phone penetration. Many households have been able to buy phones, and even more are able access them by borrowing from friends or relatives. This has been of great help to the migrant fishermen who are not forced to travel long distances to their home villages in order to remit cash to their family members. Instead, they are widely using applications like M-Pesa and Airtel Money to send remittances by mobile phones. The connections are still not particularly reliable on Ukara, and especially internet can be accessed only occasionally, but at least two major operators have built mobile phone towers in Nyamanga and Nyang'ombe villages respectively. Many, but not all, households that I visited possessed at least one mobile phone. But the cost of charging the device or of buying pre-paid credit to send text messages and make calls is a clear constraint to getting the full benefits out of the phone. In any case, mobile phones have changed the ways that the multi-local households including migrant members communicate, interact and coordinate their livelihood options. The need to buy credit for a mobile phone is a completely new financial cost for most local households. It would seem obvious that one must have cash to buy credit, but in practice many local households borrow credit from their neighbours when needed and pay back reciprocally in foodstuffs or even through labour exchange. In any case, mobile phones can save time and effort through better coordination of household activities. Potentially, remittances sent via mobile applications can also help a household survive a hungry season or pay for health centre fees if a family member has fallen ill.

An important economic trend is the rising price levels for both fish and foodstuffs, which is due to an increased demand for crops locally and for fish regionally and globally. I have combined a listing of typical prices of some common commodities produced and/or sold on Ukara. While I have not been able to satisfactorily collect the change in price levels in any time frame, it was generally noted by my informants that as far as agricultural produce and fish is concerned, the price hikes have been substantial and have affected their household's finances negatively. Prices for both crops and fish are also typically seasonal, but the differences have not been made visible here as no sufficiently reliable data was available. This data refers to price levels in January and February, 2013.

Fish	**TSH**	**USD**
Nile perch (kg, fresh)	2500	1,56
Nile perch (kg, fresh), low season	3800	2,38
Silver cyprinid (kg, dried)	2000	1,25
Salalaries for some occupations	**TSH**	**USD**
Monthly salary for ward exec. council's chairman	250000	156,25
Monthly salary of a primary school teacher	200000	125,00
Monthly salary of a secondary school teacher	370000	231,25
Monthly salary of crew member (silver cyprinid)	30000 to 250000	18,75 to 156,25
Some costs mentioned by young men	**TSH**	**USD**
Bottle of soda	800	0,50
Cup of coffee	40	0,03
Fuel for motorbike (per litre)	2500	1,56
Kitumbuo, maize flour bun (per piece)	100	0,06
Motorbike rental (day)	7000	4,38
Normal bribe to a policeman	10000	6,25
Recharging mobile phone	200 to 500	0,13 to 0,31
Ticket to watch a football game in TV	300	0,19
Visit to a local brothel	5000	3,13
Some costs to farming households	**TSH**	**USD**
Hiring labour to prepare fields (per acre)	15000 to 30000	9,38 to 18,75
Soap (per bar)	200	0,13
Box of matches	100	0,06
Cultivable land (per acre)	250000	156,25
Ferry ticket (Ukara to Ukerewe)	800	0,50
Health centre registration fee	1500	0,94
Plastic sandals	2500	1,56
Secondary school fee (annually, incl. materials)	40000	25,00
Umbrella	5000	3,13
Agricultural produce	**TSH**	**USD**
Pombe, locally brewed beer (per cup)	500	0,31
Banana (per piece)	150	0,09
Cassava (flour, per bucket)	12000	7,50
Cassava (uncooked, per bucket)	10000	6,25
Cattle (per head, big animal)	600000	375,00
Cattle (per head, small animal)	150000	93,75
Fried peanuts (small bag)	100	0,06
Pineapple (per piece)	1000	0,63
Rice (uncooked, per bucket)	20000	12,50
Sweet potato (uncooked, per bucket)	7500	4,69
Tomato (per piece)	100	0,06

Table 5: Prices for some commodities and services on Ukara Island, Jan-Feb 2013.
Source: Information gathered from author's fieldnotes, currency exchange rate 1 USD = 1600 TSH.

Shocks are serious and sudden disruptions affecting the household assets or members directly. On Ukara the most important recent shocks have been the notorious cassava disease that has led to severe crop losses and the chicken disease resulting in many households losing all their poultry. For many households it has been very difficult to cope with such shocks and recover from them. Also the sickness or death of a household member may understandably have serious implications both economically and psychologically. Many households are finding it particularly difficult to meet the labour needs of both on-farm and non-farm activities even in absence of disruptions, and the unfortunate case of a household member falling ill may have serious consequences for the whole household.

Seasonalities are affecting livelihoods in agriculture, business and fishing sector. But seasonalities being generally rather predictable, the local household stated that these are not usually as difficult to tackle as sudden shocks. As mentioned earlier, the adoption of cassava instead of sorghum and bulrush millet has largely reduced the likelihood of an annual hungry period when the food storages are diminishing. In fishing of dagaa, everyone knows that it is cannot be caught near full moon, and one cannot rely on any income during that time (P18). While the fishing business has provided new economic opportunities on Ukara, not all households have been able to benefit from them. Especially from the poorer households' perspective, the changes they have witnessed in their vulnerability context over the last few decades, may present new challenges that make their lives even poorer and riskier. In other words, the vulnerability context affects local livelihoods by both creating and shattering economic opportunities and household assets.

In constructing their livelihood strategies, the local households must take the vulnerability context into account as well as they can. Managing potential risks lies at the core of rural people's livelihoods, and the short-term coping measures and long-term adaptation strategies are based on each individual household's expected resource availability and their expected needs. (Dorward et al. 2001). Whether a livelihood strategy is sustainable and resilient, is dependent on the severity of the shocks and on how skilfully the household has been able to utilise its asset base in pursuing different activities related to production and reproduction. Generally speaking, the households on Ukara are vulnerable but not powerless; they have indeed many ways to prepare for hardships and to cope with and adapt to the new living conditions. And as Hussein and

Nelson (1998, p. 16) argue, the measures they are taking may be positive, functional and sustainable, or they can be the opposite. Now, I will have a look at the household asset bases through accounts derived from five interviews.

6.3.2 Livelihood Assets or 'Capitals'

While the vulnerability context has an impact on all households on Ukara, the picture of those becomes more nuanced and differentiated when looking at the livelihood capitals of particular households. The combination of human, natural, financial, social and physical 'capitals' is different for each household, and leads us to the fact that there can be great variation found in the livelihood strategies pursued by different households. Both the vulnerability context and the set of livelihood assets available for each household varies over time, which evidently forces the rural people to constantly revise and adjust their livelihood strategies. In my view, even a rough estimate of the household asset base is likely to be a more accurate indicator of the quality of living than any measurements based solely on income-levels. Mwanga et al. (2013) have even adopted a very simple method of getting an overview of the local-level wealth disparities on Hamuyebe village on Ukerewe Island. In their study the authors looked at three aspects of asset holdings: land, bicycles and radio receivers (ibid.). I find this kind of index useful, but it is important to understand that it can only provide a partial view of the multi-dimensional concepts of poverty and inequality. I am inclined to think that the deeper sentiments of powerlessness can only be collected by listening to the people's own accounts of their life situations. On the other hand, it occurred to me that my interviewees themselves considered the following tangible assets as most important: acreage of land, number of livestock, type of housing and the number of fishing boats owned by the household.

The typical farming household on Ukara possess several different types of capital. The human capital includes all the household members and their personal capabilities, such as age, sex, health, education and occupation. A household with no able-bodied male labour, is likely to be in a vulnerable position. The social processes and institutions also have an impact on how a household can utilise its human capital. I will give an overview of these in chapter 6.3.3. As I have explained, households on Ukara are

generally large, mainly due to the low availability of land and the social and potential economic value related to children.

The most important aspects of natural capital on Ukara are land for cultivation and grazing, livestock, trees and the easily accessible water areas of Lake Victoria. Any household on Ukara builds it subsistence on these assets. Financial capital such as availability of cash and access to savings, credits and insurance are generally low among the households that I interviewed. The poor access to credit facilities has hindered the local household's possibilities to fully benefit from the fishery, as buying of fishing boats has been impossible without large enough cash reserves. Social capital is related to the household members' social status, their ability to participate in local decision making and the strength of their social networks in obtaining important information and being able to take part in reciprocal lending and borrowing with neighbours, friends and relatives. While social capital is intangible and difficult to measure, it remains an extremely important factor in local livelihoods. Physical capital includes the tools, houses, technologies and vehicles that a household owns and the physical infrastructure such as roads, wells and electricity grids it can access. On Ukara, physical capital has been low, but it is slowly improving, as some households have been able to upgrade from thatched mud houses to better quality brick houses with corrugated iron roofs. While there is no power supply or grid on Ukara, some households have invested in solar panels, which is contributing to their physical capital.

Curiously, the different types of assets can affect the value of other assets or capitals possessed in positive or negative ways. The value of owning farmland is greatly enhanced if the household possesses livestock to produce enough composted manure to preserve the quality of the soil. By the same token, the value of livestock is tied to the availability of suitable fodder and the household's ability to access markets for selling milk, meat or live animals. The people were very much aware of the fact that especially live cattle can be sold at higher prices on the neighbouring Ukerewe than on Ukara, while they also acknowledged that clothes and buying clothes or durables is cheaper on Ukerewe. Here the installation of ferry service between the two islands has been a major improvement in physical capital and also allowing for improved value for livestock sales, especially for households living in close proximity to the port of Bwisya.

6.3.3 Policies, Institutions and Processes Mediating Livelihood Choices

The interplay between structure and agency becomes most apparent when analysing the relevant policies, institutions and processes relating to rural people's livelihood strategies. While there is a tendency among the proponents of livelihoods approach to put a strong emphasis on the agency of the local people themselves, we should not downplay the role of the actual 'playing field' where they make their choices. They face many allowing and constraining factors that either limit or expand the portfolio of viable opportunities available to them. In the Sustainable Livelihoods Framework, formulated by Scoones (1998), policies, institutions and processes (PIPs) represent both *structural elements*, such as levels of government and private sector, and *processes*, including laws, policies, culture and institutions. Ellis (2000) has further explained that the most relevant PIPs are *social relations*, comprising gender, caste, class, age, ethnicity, and religion. In his view, *institutions* include both formal and informal rules and codes of behaviour, such as laws, property rights and markets. The third aspect of the PIPs, in Ellis' (ibid.) analysis, comprise *organisations*, like NGOs, associations, private companies and government agencies. Simply put, the PIPs are about how things work.

I have already explained some of the most important PIPs in the earlier chapters. In chapter 6.1 I discussed some key issues related to accessing cultivable land through buying, renting or inheriting. I argued that both social relations and both formal and informal rules create the binding framework for gaining access to land. It is noteworthy to pay attention to the ways in which such processes exclude some groups of people from accessing cultivable land. Typically unmarried women, widows, and people migrating to Ukara from elsewhere face barriers to accessing farmland. The households who are landless or in possession of too little land to meet their own nutritional needs, are likely to be among the most vulnerable people living on Ukara.

In chapter 6.2 I focussed on the fishing industry and presented some relevant PIPs, too. While the highly unregulated nature of the open-access fishery in principle allows anyone with a boat to go out fishing, there are some important bottlenecks for being able to profit from the fishing business. Firstly, accessing credit remains a severe problem for many potential boat owners. Secondly, the owners of the fishing camps have a clear tendency to hire relatives, members of their own lineage or at least people from their own ethnic group (P2; P18). This is partly due to the question of trust, as it is

difficult for the employer to control the employees' work while they are out on the lake. On the other hand, the boat owners may want to help some unemployed youth within their own kin, or it might be useful for them to forge patron-client relationships with people from their own area. One boat owner from Ukerewe (P18) clarified that he only employs young Kerewe men from his own village to work at his camp. Thirdly, the strongly engendered nature of the fishing business restricts women from working as crewmembers in the fishing boats.

The gender dimension of livelihood practices on Ukara is an important factor mediating the local households' decisions. Gender roles govern one of the most crucial power relations in any society, and should not be neglected when discussing rural livelihoods either. In my interviews, it became soon apparent that there is a clear distinction in how men and women perceive life in their communities. While I want to avoid making blunt generalisations, it was notable that the men that I interviewed, tended to possess much more information on issues related to communal life and especially on news related to issues taking place at the regional and national level. This is very much natural, however, as the mens' sphere of life is wider than that of the women's who are likely to take care of most activities within the household. Men are expected and allowed to participate in the communal activities, whereas women are largely confined to the homestead and socialising with other women while fetching water from the well. I clarified the gender roles further in the questionnaire with the question 'What is the division of labour between men and women in your household?' I have collected the responses by the secondary school students in the table below.

Household activities, girls and women	**No. of Responses**
Cooking	31
Working on the fields	19
Fetching water	10
Washing the dishes	9
Cleaning	5
Processing cassava	4
Collecting firewood	3
Household activities, boys and men	
Rearing livestock	19
Working on the fields	16
Fishing	9
Collecting grass for livestock and for composting	6
Fetching water	4
Cleaning the yard	4
Washing the dishes	1

Table 6: Household activities differentiated by sex
Source: Questionnaire, Bwisya Secondary School, February 2014, conducted by Tomi Lounio.

There is some variation in the main activities between females and males. Most importantly, women take care of all activities in the kitchen. Only seldom do the men even enter the kitchen (*jiko)* as it is strictly the women's domain. In a similar manner, all tasks related to rearing livestock and fishing appear to be reserved for the men. Again, we should remain wary of drawing too hasty conclusions, as in the interview data one of my interviewees (man, aged 54, P31) stated that traditionally the cows were taken care of by the women, while men were responsible of the oxen. He added that nowadays the gender roles have become less clear as there is an increased burden upon the women as the men labour outside of the household more than earlier. Another informant (woman, aged 35, P33) expressed her worry over the same issue. In her view, in many households the women are expected to work on the fields, feed the livestock, cook for the household and take care of the children, while men only go fishing. She insisted that in spite of their work outside of the household, the men could carry a bigger share of the burden if they wanted.

This gender gap is also evident in some cultural customs that I witnessed. During meals, adult men get to sit down and eat first, sometimes with older women, while younger women and girls serve the food. The best parts of the food are also reserved for the men and possible visitors, the gizzard (*firigisi*) of chicken or duck being the most desirable piece. In all households that I visited, I noticed a similar pattern in the process of sitting down while having a conversation. Without any exceptions, the best chairs were given to the adult men and if there were enough of them, to the adult women. Subsequently, the younger men were able to sit, followed by the younger women. Children were sat on the ground. This procedure was carefully adhered to, and was even more clearly demonstrated when new people arrived to the homestead. In the farming households the hierarchical roles between the household members remain much more pronounced than in the fishing camps, where the younger man have relatively more authority.

The heavy burden carried out by the women within the household feels particularly unequal when the afore-mentioned process of land ownership is considered. According to the traditional practices, the women cannot own or inherit land and they have very low control over their own labour when their fathers or husbands need it. This is reflected in the questionnaire responses. Of all the 56 students who responded the question 'Who makes the decisions on farming and cultivation activities?', only 19 stated that father makes the decisions alone. 27 respondents explained that parents make the decisions between themselves, 5 respondents wrote that their mother is the one who makes the decisions. 4 respondents said that the whole household plans the activities together, while 1 respondent stated that his brother is the one who decides. It is noteworthy that in spite of the women are taking care of work related to farming and cultivation, they do not have much say on planning the relevant activities, not at least without their husbands' consent.

Understanding the gendered division of labour and the intra-household decision making patterns is a process that takes time, however, and I feel that I did not have enough time to dig deep enough into these issues during my fieldwork. Both the ownership rights and decision making positions of the household members are issues that are likely to differ between households. Power relations are seldom clear-cut, and even the subordinate individuals within the household can usually negotiate their own position through a dynamic process of 'wielding and yielding' (De Haan & Zoomers, 2005). Another relevant remark is made by Lakwo (2006, p. 108), who notes that women have

more commonly more power on deciding their daughters' labour than that of their sons. Similarly, one respondent (R56) asserted that in her household "girls help their mother while boys work with their father". Another respondent (R61) claims that at his home mother is the one who makes decisions to crop cultivation and father is solely responsible of fishing. The prolonged absenteeism of the fathers who participate in fishing or other non-farm activities, has definitely had an impact on many households on Ukara.

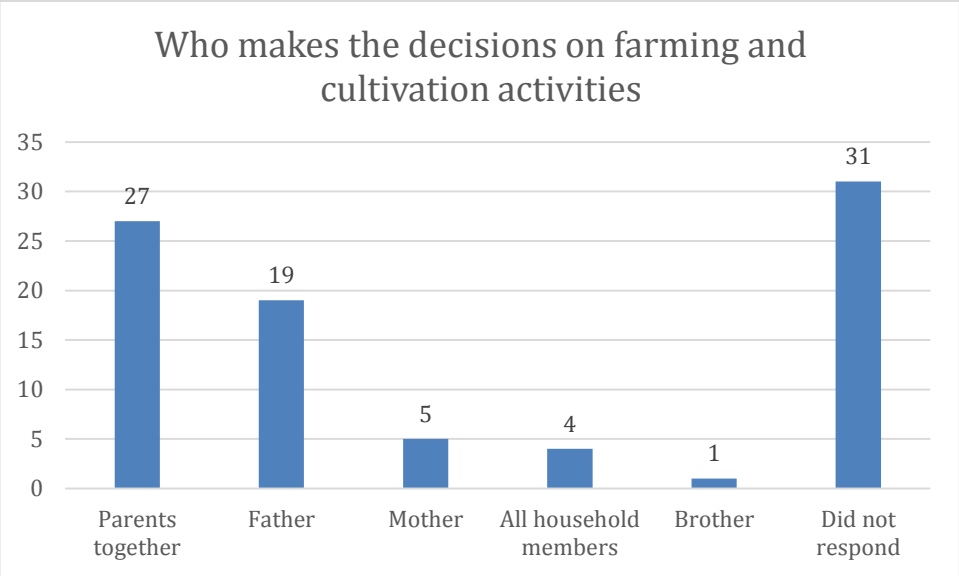

Figure 8: Who makes the decisions on farming and cultivation activities
Source: Questionnaire, Bwisya Secondary School, February 2014, conducted by Tomi Lounio.

Based on my interviews, one cultural factor that has been relevant for constraining the accumulation of visible livelihood assets, such as improved housing, is the fear of jealousy and even hatred caused among the neighbours. One man, aged 18 (P34), said that if one aspires to become rich on Ukara, it is better not to show it because of traditional beliefs. Another man, aged 41, explained that there has been a tradition of the villagers killing a neighbour who has accumulated wealth quickly, as they believe that s/he must be using some harmful religious methods or black magic. He said that this custom is dying out, and went on to elaborate that in his view, this has been the community's way to suppress a sudden threat to the local balance of power. In the absence of written documentation, it is difficult to say, how common such killings might have been in the past. Nonetheless, in any case it is a strong myth or idea that

people have taken into consideration. According to one interviewee (man, aged 50, P37) this applies to educating children, as well. He thinks that one reason for so many local households sending their offspring to schools outside of Ukara, is the idea that they want to minimize the likelihood of generating jealousy among their poorer neighbours. If this is true, it goes to show how careful the local households are in building and preserving their social capital. Building a better house could be a major investment in the household's physical capital and educating children would enhance its human capital, but the households have still been willing to minimise such investments' negative impact on their social standing and status.

No household on Ukara is living in a vacuum and most of their choices are tightly socially embedded. While it would be futile to claim that all of their choices were predominantly based on strategic calculations, it is clear that the households have many motivations and aspirations which are related to receiving recognition and acceptance in the eyes of the local community and not on reaping any economic gains. Such decisions may first occur to the field researcher as irrational, but the local people often have clear reasoning for their actions or inactions. Now I will take a closer look at the local households' livelihood choices through five case studies chosen among my interviews.

6.3.4 Livelihood Strategies and Outcomes

I have discussed the main activities on Ukara in the earlier chapters. The local households base their livelihoods on crop cultivation, cattle-keeping, fishing and other possible off-farmand non-farm activities. But in this chapter I will present how the individual households combine these and construct a portfolio of activities based on the capitals that they either possess or are able to access. I will begin with the account by Mr Juma (anonymised) who I interviewed at two different occasions at his homestead.

> Mr Juma is a farmer, 50 years of age. He lives in Katende, village with his wife and his 8 children. The eldest child is 23 years old, the youngest only 9. Mr Juma farms cassava, sweet potatoes, maize, rice, bananas, papayas and some oranges. He has four heads of cattle, three goats and two chickens. He used to have more chickens, but they fell ill due to a poultry disease and died the year before. Mr Juma claims that seasonally it is difficult to obtain enough food to feed the whole household, especially in October and November. Usually they have enough food, however. Cassava disease has affected his household food production negatively, and they have not been able to sell any crops to outsiders in two years. Mr Juma goes fishing silver cyprinid occasionally, but only for his household's own consumption, although in his youth he worked as a professional fisherman. According to Mr

> Juma, nothing grows on his fields unless he uses animal manure. He does not use any industrial inputs. He states that he cannot afford to let any of his fields lie fallow, even though he has seen that this leads to declining soil fertility. He has relatives on Ukerewe, where they have bigger fields that yield better harvests because they apply a fallow period regularly. Mr Juma is sad because the traditional cultural customs and feasts of the Kara are dying out. In his view, both crime and crop prices have been on the rise because there are too many people living on Ukara. Mr Juma says that there have been some positive developments, too, and he mentions the ferry connection to Ukerewe that was established in 2004. Transportation is also easier on Ukara because of the introduction of motorbikes. He sees the building of modern brick houses as a positive outside influence, but he himself lives in a mud hut with a thatched roof. He also has a mobile phone which is important for keeping in touch with his relatives, but at the moment his battery is dead and he has no credit. Mr Juma's household does not receive any remittance income. In his opinion, life on Ukara is much more difficult than before. If he had enough money, he would move to Geita and buy a big piece of land. Many of his friends and relatives have left Ukara for Geita or Sengerema and have been able to raise their living standards substantially. (P20)

In this dense narrative of Mr Juma's life, we find a rather typical presentation of a local household that is first and foremost dependant on crop cultivation. His household aims at securing its nutritional needs by cultivating cassava and sweet potatoes. Maize is mainly eaten fried, as a snack, and rice is mainly cultivated as a cash crop, allowing him to pay for his children's school fees. But the shock caused by the cassava disease has caused their household to eat everything they produce, creating a situation where obtaining money to pay the school fees has become difficult. Their household is coping by reducing nutritional intake seasonally, a strategy which may prove costly if it contributed to a household member falling ill.

Another coping strategy is the borrowing of money from members of his lineage and exchanging foodstuffs with both neighbours and relatives. This has worked well, as the household has strong social networks on Ukara and are active members of the local church. While Mr Juma is not a wealthy man with many assets, his household members' good health and relatively strong social capital help to access relevant information and to buffer hunger through borrowing in times of crisis. While indebtedness is a severe threat to poor households (Lappé et al., 1998, p.18), investing in social relations remains a much better option than selling productive household assets such as livestock or farmland. Mr Juma emphasised that he feels that it is important to help other people in times of need, and he expressed an appreciation of the traditional community values also in this regard. His household has also benefited from their diverse crop base in times of cassava harvest failure, and crop diversification can be seen as a intentional

risk-minimising ex-ante strategy. Mr Juma's crop selection of cassava, sweet potatoes, maize, rice and some fruit trees is rather typical on Ukara, but not all households can afford to adopt as diverse pattern of cropping due to insufficient human and natural capital.

While I do not aim to present a clear typology of the local livelihoods, it has to be emphasised that Mr Juma's household is not currently directly benefiting from the growth of the commercial fishing business or other non-farm opportunities either. In his youth he was a fisherman, but now he feels that he is too old to work at a fishing camp. Instead, he is complaining of the rising price levels and has some reservations towards the migrant fishermen and their customs. On the other hand, he is living in very close proximity to a fishing camp and in the absence of the cassava disease he might be producing surplus cassava that could be sold to the fishermen. The poultry disease has also negatively affected his households' assets. Mr Juma is worried about his household members' wellbeing and believes that life would be easier elsewhere. Due to the fragmentation of land inheritance, his rice fields are some four kilometres from his home and his household does not own a bicycle or any other means of transport. He explained that having one big piece of land would make his life much easier. On the other hand, migrating elsewhere would contain risks and sacrificing social capital. Most of my informants were well aware of the fact that some people who had migrated out of Ukara had manage to build a good life, whereas some others had failed miserably.

In the next case study I present the livelihood situation of Mr Kilenge's (anonymised) household, which has, contrary to Mr Juma's household, benefited from diversification through labour migration:

> Mr Kilenge is 23 years old and lives in Bukalamila, west of Bwisya village, with his mother, sister and his brother's child. His father has left his mother and moved out of Ukara. His household is cultivating cassava, rice, sweet potatoes and some sorghum Cassava disease has affected the harvest seriously and they have not been able to sell any of it, but rice is an important cash crop for his household. He says that last year his household was suffering of hunger more than ever before. He states that they survived, because they were able to buy maize from neighbours with the income derived from selling rice. Their household has one head of cattle, four goats and three chickens. Mr Kilenge states that his household is struggling to gain subsistence because they simply do not possess enough land to cultivate. They get some occasional remittance income from his two brothers who are working outside of Ukara, but only if the fishing season has been particularly good. One brother is working as a fisherman, one is working as a crewmember in transporting building materials and related items by boat from Mwanza to Ukara. Third brother is a farmer on Ukara. Himself he did not have the chance to go to secondary school. He says that his household lost money on his sister's secondary school fees

> as she dropped out, but he refuses to tell the reason. After primary school, Mr Kilenge worked briefly as a fisherman, but his mother told him to move back home and help her in cultivating. He is frustrated, because his mother makes all the decisions related to cultivation. He would want to move out and build his own house, but this will not be possible unless the rice harvest is particularly good. At the moment he does not even have 200 TSH to buy a bar of soap. He says that there is too little land available on Ukara and too many conflicts related to it, but he cannot move elsewhere because she must take care of his old mother. (P30.)

Mr Kilenge's household has an insufficient natural capital in terms of cultivable fields. They also have relatively low human capital, as no members have graduated from secondary school. His sister's decision to drop out of secondary school has been a major blow for the household's expectations as they had invested a significant share of their financial capital in their attempt towards elevating their human capital through education. Their crop selection is rather typical, but like so many other households on Ukara, their food security has suffered due to the cassava disease. The main strategies for coping have been buying maize. It is likely that the household has been keeping some savings for avoiding hunger, but we did not discuss this issue. The household gets some remittance income from the two brothers who are working as crewmembers on the lake, but as he notes, this income flow is not constant. In spite of the seasonality of the fishing and even transport activities, this diversification through migration is an important part of the household's livelihood portfolio. Whatever the decision-making process has been like, the household has opted to send two able-bodied males to find non-farm employment elsewhere. As I have explained in chapter 6.2, this is a relatively risk-free solution as the crewmembers are provided meals at the fishing camps. As the sending household has only little land and few heads of livestock, it is likely that their labour is not needed in the agro-pastoral activities. Simultaneously, the youngest son - Mr Kilenge himself - has been told to take care of his mother and the family farm, even though he does not have much say on the household decision-making. This is a very common method of allocating household's human capital on Ukara today. Having at least one adult male in the household is valuable for both improving security and meeting labour needs in the certain tasks considered to be in the male domain. Parallal to this idea, Minot (2008 p. 268) points out that in Tanzania male-headed households have been able to benefit from the new economic opportunities and lift themselves out of poverty much more efficiently than female-headed households. His mother currently

heads Mr Kilenge's household, but in his absence she would be more vulnerable to potential land grabbing and more burdened with hard work.

In the next case study we look at Mr Tunda's (anonymised) household's livelihoods. He is the head of his farming household, but has himself sought non-farm employment in order to diversify and generate the needed income:

> Mr Tunda is 54 years old and lives in Bwisya village, not far from the main port of Ukara. He has 15 children, but 10 of them have already moved out. Five of his daughters have married, and in marriage they become members of their husband's lineage. Four of the married daughters have left Ukara, but one lives nearby. Two of his sons have built houses on Ukara, on the plots of land Mr Tunda gave them. Three sons have left Ukara to work elsewhere. Now Mr Tunda lives with his wife, his five children and four grandchildren. They have three heads of cattle, three goats, five ducks and two chickens. There were much more chickens, but most were killed by the poultry disease. Their most important crops are cassava and sweet potatoes, but for minimising the possibility of going hungry they also cultivate some maize and bulrush millet. Recently cassava disease has caused enormous problems for the household. Mr Tunda has bought new cassava cuttings from Ukara as he believes that all cassava cuttings on Ukara carry the disease. He does not want to complain because many other households on Ukara were suffering from hunger last autumn. He says that they have significantly shortened the growth period for cassava, as nowadays they must harvest it earlier to get enough food to eat. Mr Tunda is working as a security guard at the local mobile phone connection tower. In his view, it is very problematic that young men do not have the time to participate in cultivation anymore. He says that the division of labour has severely altered, as the men must find employment outside of the household while women take care of the fields. Usually women cultivate, feed the livestock, collect firewood and cook food, while men prepare the fields before cultivation, go fishing and take care of other necessary income-generating activities. The fields on Ukara are too small to produce significant amounts of cash crops to pay school fees and health centre fees. If he had more money, he would buy more land, but he thinks that land on Ukara is very expensive because no one can afford to sell without food security. Mr Tunda says that the soil quality has diminished substantially, but there is nothing they can do about it but to try to apply more manure. He says that he is politically active in the opposition party and is sad because the ruling party is doing nothing to help the people on Ukara. (P31.)

Mr Tunda's household is large, comprising 11 people. Their agro-pastoral activities including the crop selection of cassava, sweet potatoes, maize and millet and keeping three heads of cattle, are highly typical for a farming household on Ukara. In normal times, most calories are derived from cassava and sweet potatoes, but now they are coping with the shocks caused by cassava and poultry disease mainly by consuming more maize and millet, and by using the cash he has derived from his work as a security guard. The opportunities for finding a constant employment with a monthly salary are extremely scarce on Ukara, especially outside of the fishing industry. Mr Tunda

working for a mobile phone company is a clear example of the slow but seemingly inevitable penetration of large-scale capitalism to eve some of the most remote parts of Eastern Africa. While most business and trade on Ukara remain informal, there is a growing numbers of tiny shops and kiosks on Ukara, especially in areas within close proximity to the fishing camps, namely in the villages of Bwisya, Chibasi, Chifule and Kome. I have collected all the different non-farm activities occupations during my fieldwork in the table below:

Table 7: Non-farm Occupations on Ukara, Segregated by Sex

Male	**Female**
Barber	Cleaner (at a guest house)
Bicycle repairman	Hair dresser
Boat builder	Prostitute
Butcher	Waitress (at a small cafe or restaurant)
Clerk (at a shop selling music and DVDs)	
Clerk (at an internet cafe, print shop)	
Charcoal maker	
Crewmember (at a boat)	
Fish trader	**Male and female**
Fisherman	Bartender
Fishing camp owner	Civil servant (elected or allocated)
Fishnet maker	Cook (at a small cafe or restaurant)
House builder	Entrepreneur (cafe, guest house, kiosk, restaurant)
Mechanic (repairing boat motors and motorbikes)	Extension worker (agriculture, education, livestock)
Miller	Fish processor
Motorbike driver	Food seller (informal, on the street or at the market)
Police officer	Fruit seller (at the market or travelling)
Priest or other religious leader	Nurse
Salesman (travelling)	Pharmacy-keeper
Security guard	Salesperson (informal, on the street)
Traditional healer ('mganga')	Shop-keeper (incl. kiosks, cloth shops, small durables etc.)
Trench digger or other hired labourer	Tailor/sewer
Worker (at the port, carrying luggage)	Teacher
Worker (making and selling bricks)	

Table 7: Non-farm occupations on Ukara, segregated by sex.
Source: Questionnaire, Bwisya Secondary School, February 2014, conducted by Tomi Lounio.

The table above includes all non-farm activities that I observed on Ukara. The listing is by no means exhaustive, but gives a good overview of the economic activities pursued by the local people. A few issues must be emphasised. First, men are much more active

in the non-farm sector than women, and their different occupations are more diverse. Second, in spite of this, the women do have non-farm opportunities available to them. There is at least some space for women to work outside the household and these opportunities have been widening rapidly. Third, the segregation by sex is probably as rigid in practice as shown here. On Ukerewe, I observed female police officers and traditional healers, and men working as waiters in small local restaurant. It is likely that this could be possible on Ukara, too, but the listing above is crafted upon my actual observations on Ukara only. Fourth, in spite of this, women remain more active in the farm and off-farm sectors. Women often earn some small income by processing and selling their own agricultural produce on their yards. Their products may include locally brewed beer, roasted groundnuts or other types of foodstuffs. Fifth, some of the occupations listed above have been taken up by children, and some of them are very young. A household may opt to send the older children to sell pastry or home-made porridge to the marketplace in the mornings, while many boys and girls are providing cheap labour to the fishing camps in the process of drying the silver cyprinid. Sixth, many of the occupations listed are either seasonal or part-time. Additionally, the most profitable occupations, including government officials, nurses, teachers, and owners of bigger shops or fishing camps, are predominantly reserved for non-Kara migrant workers. Depending on the occupation, this can be explained by government policies of allocating civil servants and teachers or it can be related to the educational qualifications or amounts of capital needed.

In the next example of local livelihoods, Mrs Malaika (anonymised) gives an account of the gender disparities with regards to diversification through migration. Her household is trying to survive on cultivation alone, but she is hoping that in the near future her eldest son would go and work outside of Ukara:

> Mrs Malaika is 50 years old and lives in Katende, east of Bwisya village. She lives with her husband and her seven children. They cultivate cassava, sweet potatoes, maize, sorghum and bulrush millet. They have also a small number papaya, banana, orange and lemon trees. They have had difficulties in gaining subsistence last year because of the cassava disease. Normally, they have been able to make money by selling cassava to the migrant fishermen, but in two years they have not had any agricultural surplus. They have three heads of cattle and two goats. Mrs Malaika's household used to have chickens, too, but the poultry disease killed each of them. In her opinion, manuring the fields is crucially important. Otherwise nothing will grow. They apply a zero-grazing method to their bull, keep it always locked and compost different types of leaves and grasses with its manure for composting. She thinks that one must use manure in order to be successful in cultivating, but some people do not apply enough, which has led to soil

> deterioration. Her household used to cultivate sorghum and bulrush millet, but in the early 1980s they chose to switch to cassava because it is easier to grow and because the migrant fishermen paid better prices for it. Her household has no other economic activities than cultivating, which is one reason why their life is so difficult. Now his eldest son is 20 years old and would like to leave and work elsewhere, which might help them, but Mrs Malaika is not sure if he will be successful as he has not been to secondary school. She, however, says that there are many employment opportunities for young men outside of Ukara, whereas young women can only marry or try to do some petty trade, which does not pay much at all. Mrs Malaika thinks that Ukara's population has grown rapidly and there are nowadays people belonging to many different ethnic groups. This might be good for her household if they had something to sell to them, but at the moment their production is far too low. (P19)

For Mrs Malaika's household, cultivable land forms of particularly valuable part of their natural capital, because all their income depends on it. She described carefully their decision to adopt cassava as their primary crop, and stressed the importance of taking extremely good care of the fragile soils. The sustainability of their, and many other households', livelihoods would be at stake, if they could not preserve the fertility of their farmland. Measuring the possible rates of soil depletion on Ukara is beyond the scope of this study, but would be a meaningful topic for further research. Already Ludwig (1968) observed severe land erosion at some parts of the island, but the important question is whether the current, intensive soil management practices can prevent depletion of the minerals and organic matter in the long term. Historical evidence from Ukara suggests that this has been done successfully so far, but many informants stressed that they are getting lower harvests than before. Mrs Malaika is putting the blame on people who do not apply enough manure, but it is uncertain whether the soils are depleting even under appropriate manuring.

The question of Mrs Malaika's son leaving Ukara for work in other parts of the country is also important for her household. Even though she has as many as seven children and all of them are in good health, none of them has been able to attend secondary school. She understands the value of education well, but the household's income-generating activities have not been sufficient to support her children's secondary school fees, even though the more urgent consumption needs have been met rather successfully. At the same time, she is well aware of the fact that young men have much more opportunities to find non-farm employment than women, especially if they possess sufficient social capital in terms of suitable social networks. As I discussed with Mrs Malaika's son, he articulated her preference to migrate to Europe, but admitted that it seems impossible

because he does not have any connection to that part of the world. In my other interviews it became apparent that many Kara would like to migrate, but most do not dare to make the decision unless they have some friends or relatives in the destination area.

I addressed this issue of migration in the questionnaire by inquiring the students of Bwisya Secondary School: "What are your plans after completing your secondary school studies? Have you thought about moving out of Ukara? If yes, where have you thought about moving?" Most of the respondents, 82% (n=71) stated that they would like to migrate outside of Ukara. The possible destination areas included nearby areas, mainly Ukerewe, Mwanza or Musoma, but also locations further away from Ukara, including the towns of Dar es Salaam, Arusha and Dodoma. But some indicated that they wish to get the chance to move abroad, even all the way to South Africa, Europe or the United States. Some of these hopes are more realistic than others, but most respondents share the idea that they cannot get full benefits out of their secondary education by staying on Ukara. Despite the growing non-farm opportunities on the island, continuing their studies or finding better employment is mainly possible outside of Ukara. One respondent (woman, 19 years, R80) stated: "Having finished school I will leave Ukara and move to Mara Region. I will start selling clothes and medicine. I want to lift my family out of poverty through business." Like Mrs Malaika's son, this respondent suggests that her decision to migrate would be affected by her willingness to provide better future for her household. Another respondent (man, 19 years, R17) would not be as keen to migrate: "After finishing school, the most important thing for me is to help my parents in their work." This man is also prepared to assist his household, but believes that it would be important for him to do this by labouring at his family farm. While some respondents seem to be more concerned of their personal aspirations, which may, however, well be compatible with the household' interests. Having an educated family member with secure and well-paid employment is highly desirable for most households on Ukara.

Mrs Malaika admitted that her household has been unable to pay their children's school fees. In this sense, the questionnaire respondents at Bwisya Secondary School belong to a more fortunate group of young people on Ukara. Household strategies differ and education is not the sole pathway out of poverty, but it is fair to assume that the secondary school leavers' households are in better position in terms of their livelihood

outcomes than Mrs Malaika's or Mr Kilenge's households that have not been able to educate their offspring. The secondary school students' households have made sacrifices, however. They have been working hard and utilised their household capitals in successful ways to be able to get enough cash needed for education. In the questionnaire, I asked the students: "How do you obtain money to pay your school fees?" Their responses have been given below.

Table 8: Activities Pursued for Obtaining Money to Pay School Fees

ACTIVITY	NO. OF RESPONDENTS
Selling crops	33
Fishing	15
Small business or other employment	8
Selling coal/firewood	4
Selling cattle	3
Government subsidies	3
Borrowing	3
Selling pastry	2
Selling land	1
Selling locally brewed beer, 'pombe'	1
Not specified	26

Table 8: Activities pursued for obtaining money to pay school fees
Source: Questionnaire, Bwisya Secondary School, February 2014, conducted by Tomi Lounio.

The most important way to obtain cash is selling the household's agricultural surplus to neighbours, to the fishing camps or to anyone at the market. Very low percentage of the agricultural produce is sold through any formal routes. Instead the farming households utilise their social networks in finding customers. The rice-producing households are in a better position than others, as a higher price is paid for it than for other crops. In times of wide-scale crop losses, the prices for that particular crop may rise quickly. In such situations, those households that have been able to produce surplus are in a much better position as they suddenly have new markets for even the most basic staple crops. As Mr Tunda remarked, the price levels on Ukara have generally risen due to the growing

demand. The demand for cassava has grown significantly because of the outbreak of the cassava disease, and it is likely that some households have been able to benefit from the situation.

Other important activities pursued for obtaining school fees are fishing and related activities (trading, processing etc.) and participating in petty trade or looking for other employment. The latter may include off-farm and non-farm works. Off-farm employment tends to be temporary and includes working at other people's fields in times of land preparation or manuring. Non-farm employment includes working as a bicycle mechanic, motorbike driver or working as a salesperson, selling mobile phone vouchers or other small items. In some households the students themselves take up these activities, while in some other households other members earn money for their school fees. Obtaining enough fuel for stoves is difficult on Ukara, which is reflected in the viability of selling firewood or coal. Households that suitable trees for getting firewood can sell some of it without affecting their household assets negatively. Contrary to this, three respondents claim to have sold cattle and one respondent's household has earned cash by selling land, but according to my informants, such measures are only taken in desperate situations. Sacrificing some of any household's most crucial assets can have negative long-term consequences for its livelihoods. Three respondents state that they have received government subsidies when they have not been able to pay on time. One local government official (P33) explained that there is a scheme in place for assisting vulnerable youth, especially orphans and children of female-headed households in their studies. Selling locally brewed beer ('pombe') has practiced by one respondent's household only. In one of my informant's view, this is generally a rather common method for obtaining cash, but perhaps the respondents do not want to mention it, as it remains officially prohibited.

In the questionnaire, I also inquired: "Have you ever had problems in paying your fees on time?" This question clarifies, how efficient the respondents' households have been in pursuing their income-generating activities. As many as 43% (n=35) of the respondents stated that they have had problems or delays in paying their school fees. In the money-stricken environment, the 40 000 TSH needed to pay the annual fees is a significant barrier to attending school. When the payment is delayed, a student cannot attend classes, which may result in lagging academic performance, even though s/he would be able to pay later. The large teacher-student ratios both nationally and

especially locally in the primary and secondary schools, inadequate stationary, lack of school books and poor status of classrooms are contributing to the fact that a very low number of students manage to pass the national exams at the end of secondary school. Many poor households on Ukara are investing a lion's share of their income to pay their children's school fees, but this effort contains risks as the students' likelihood of dropping out of school or failing their final examination remains high. Nonetheless, having an educated child can still prove to be one of the more viable ways out of poverty, potentially for the whole household.

The question for obtaining cash remains one of the urgent dilemmas than any household, not only those with school fees to pay, has to solve. As Bernstein (2010, p. 103-104) elucidates, no household can survive based on farming for their own consumption only. The concept of a pure "subsistence farming" can hardly exist anymore. All households on Ukara, no matter how poor they are, must find ways to obtain cash for health centre fees and other unavoidable costs. That is to say, they are integrated in capitalist commodity relations and must sell their agricultural produce or their own labour to meet all their real-life subsistence needs (ibid.). In the last detailed case study of local livelihoods, I present the account of Mr Salenga (anonymised), who has chosen to diversify through employment as a crewmember in a fishing boat.

> Mr Salenga is 29 years old. He was born and lives in Bukiko village, but works approximately 18 days each month at a silver cyprinid fishing camp in Chibasi village. He graduated from primary school in 2002, but was not able to enter secondary school due to financial reasons. His father told him to start working as a fisherman. He is still living with his parents, even though he is married and has two children. He would like to have three more, but not more than that, because a father must be able to feed his children. Mr Salenga has four sisters and three brothers. One sister is still living in Mr Salenga's household, while three others have married. Two of them have moved outside of Ukara but one is living nearby. His three brothers have married and built houses on the plots of land their father has allocated to them. Mr Salenga's household has three heads of cattle, one goat, five chickens and four ducks. His household is cultivating only cassava, but due to the cassava disease they have not been able to sell any of it. They are using manure on their fields, but have never even thought about using industrial fertilizers. All decisions related to cultivation and labour allocation are made amongst himself and his father. Men have always more decision-making power than women. He says that in many households the elder men do not listen to the younger ones, but he is almost equal to his father. Mr Salenga says that he hates fishing because it is both difficult and dangerous, but he has no other options because in his view fishing is the only reasonable way to make money on Ukara. During the high season he earns 200 000 to 800 000 TSH/month, but usually only 15 000 to 50 000 TSH. He was able to find work at the fishing camp because one of his neighbours owns many

> fishing boats. He says that he is still living with his parents because within his lineage the youngest son customarily inherits the parents' house. He admits that he is worried, because the plot of land that he is going to inherit is not large enough to support a household. He knows many people who have moved out of Ukara, because there is not enough land available. But he himself would never want to leave permanently. His biggest dream for the future is that his children would be able to get good education in order to find work and support their parents. (P23.)

Mr Salenga's situation is similar to many others that I heard during my fieldwork. In times of inheritance the heirs are expected to divide their parents' property, which leads to further fragmentation of land, as explained in chapter 6.1.6. Mr Salenga is admittedly facing a difficult situation, as he must find new ways to support his household. Like himself, many other young men that are engaged in the fishing business, are doing because there are no better alternatives available, and because they are hoping to get lucky and earn enough money to invest in their own business, buy a fishing boat or buy more household assets, such as livestock or land. During the high season he is paid well, but often the fishermen's contracts oblige them to work during the less profitable times, too, which is causing the average monthly salary to be much lower. In any case, even the little income he gets is a significant, and probably the most important, cash source for his household. His work at the fishing camp, no matter how much he dislikes it, is also allowing for some flexibility in meeting the household's labour needs. In times of preparing the fields, Mr Salenga is participating in farming activities, which is much appreciated, he says, as he is a strong man and a good worker. This is one example of how the growing fishing industry has brought about some vital diversification opportunities for the local households. This is also contributing heavily to the increasing population density on Ukara, as young men like Mr Salenga do not necessarily have to leave the island, but can instead stay and work at the on-farm and off-farm sectors simultaneously. This is, in my view, among the most important factors explaining the processes behind the average household sizes becoming larger Ukara.

Even though Mr Salenga regards his situation as laborious and his future as somewhat uncertain, he asserts that they have not faced severe food deficits even following the cassava disease. In this regard, his household's livelihoods indicate a good level of resilience in comparison with the secondary school students' households. As many as 53% (n=46) of questionnaire respondents stated that they have faced hunger at least once over the past few years. Only 33% (n=29) indicated that their household has

normally enough land to make a decent living, but even many of these households have felt the shock caused by the cassava disease. Hence, as far as the different coping strategies are concerned, the questionnaire data suggests that diminishing food consumption is a commonly applied strategy.

Rethinking the livelihood strategies made visible in the five case studies above, I want to summarize them in four essential points. First, all these households are first and foremost reliant on crop cultivation and rearing livestock. Mr Kilenge has only one head of cattle; other informants have three or four. Secondly, all of these households are pursuing some income-generating activities and their livelihoods are diverse. Mr Juma and Mr Kilenge's households earn income from selling rice, while the latter only gets occasional remittance income from his two brothers. Mr Salenga is working as a fisherman, Mr Tunda is employed as a security guard, and Mrs Malaika's household sells surplus cassava to a fishing camp whenever they have any. Third, all the informants' have faced the shock of losing harvest because of the cassava disease in recent years, and three have lost chickens due to the poultry disease. Their ex-post coping strategies include diminishing consumption, borrowing from neighbours and relatives and using their savings. None of them had resorted to selling their most crucial assets, that is, farmland or livestock. This goes to prove that their livelihoods have at least a degree of resilience. Fourth, none of the informants is particularly satisfied with their livelihoods. They feel vulnerable and burdened with hard work. Mr Kilenge and Mr Salenga seemed particularly distressed in the interview situation. The others did not seem unhappy, but willingness to improve the quality of their livelihoods was oozing from them. I became convinced that these informants are thinking strategically, but they are uncertain of their future and do not know what lies ahead.

In the Sustainable Livelihoods Framework, the desirable livelihood outcomes include more income, increased well-being, reduced vulnerability, improved food security and more sustainable use of the natural resource base. Have these households been able to achieve some of these positive outcomes? As I do not have much accurate data of the participants' livelihood situations in the past, it is very difficult to capture the differences between past and present. But in the absence of the cassava and poultry diseases, the food security of these households would definitely be much better than it has been recently. While they have been able to cope without losing household members due to famine or disease, I have no right to assume that their well-being had

risen. The changes in the vulnerability context, including the new economic opportunities, may have contributed to higher incomes from non-farm activities, but at the same time the price levels have risen and the landholdings are even more fragmented than before.

According to the Human Development Report 2014 (UN, 2014, p. 28): "…whereas poverty can be directly observed, vulnerability cannot: it is essentially a measure of what might happen in the future." My understanding of the sentiments implicit in most of my informants' accounts is that in terms of their future livelihoods, they are worried and troubled. They are prone to health risks due to insufficient sanitation, use of unsafe water sources and poor access to health services. They are also facing economic risks related to the rising price levels and some of them reported heightened physical insecurity related to increased rates of violence and crime on Ukara. The sustainability of the farming households' livelihoods is very much dependent on the eradication of the cassava disease. These households should at least gain access to non-infested cassava cuttings in order to sustain their livelihoods in the longer term, but the service provision by the government or any other instance, including NGOs, has so far been very much insufficient.

In my opinion, the five households presented here are all rather typical as far as their asset bases and wealth statuses are concerned. Mr Kilenge's and Mrs Malaika's households are likely to be the poorest among them, while Mr Tunda's is the only one that has been able to build a house with brick walls and corrugated iron roof. The other households have mud houses with thatched roofs. None of them have motorcycles, but Mr Tunda and Mr Kilenge's households own one bicycle. Others do not own any vehicles. When Mr Juma goes fishing, he hires a boat from his neighbour and pays the rent in fish, because he has not own a boat. All these households are poor and vulnerable, but they are not completely destitute. There are many poorer households on Ukara, and these include female-headed households with no adult males, households with disabled members and households that are landless and dependent on seasonal work on other people's farms. On the other hand, there are many wealthier households, too. While my analysis above is providing some important details of the local farming households livelihood strategies, it leaves the process of social differentiation on Ukara invisible.

There is a reason to believe that diversification is an important determinant of the growing disparities on Ukara. In order to be able to fully benefit of the non-farm economic opportunities, a household must preferably possess a strong enough resource base of human capital (preferably educated and/or able-bodied men), financial capital (savings or access to credit), social capital (networks for obtaining relevant information, for borrowing or renting equipment and/or for finding employment) or physical capital (tools, equipment, vehicles). In many cases, the local households are lacking in one or more of these, but are stronger in others - most often in human or social capital - to participate in the less remunerative non-farm activities. I have shown that certain local institutions, however, form barriers towards women's participation to many of these opportunities due to the local gender roles that allow females less space to manoeuvre outside the traditional household chores and agro-pastoral activities. Also ethnicity and lineage appear to be relevant social institutions in determining who can participate and with what terms. Many of the wealthiest people on Ukara are migrants who have moved there from elsewhere or who are locals but receive considerable amounts of remittance income from elsewhere. Owning a fishing camp, a bar, a guesthouse or a large number of transport boats seemed to be among the most profitable non-farm activities on Ukara during my fieldwork. These activities are highly capital-intensive and only the most successful entrepreneurs have been able to benefit from them. The majority of non-farm activities pursued by the local households bring much lower profits, which do not allow for any considerable accumulation of wealth. In addition to this, the low-profit activities are not always low-risk activities, as especially in the fishing industry, the crewmembers are facing many life-threatening risks. Nonetheless, even diversification through low-profit activities remains a better option than no diversification at all. The households with too low household capitals to participate in non-farm activities are reliant on borrowing or support received through their social networks. Based on my observations and interviews, these households are among the poorest and most vulnerable on Ukara. They are often trapped in a vicious cycle of poverty that may have severe long-term consequences even across generations as they cannot pay for their children's health costs and school fees.

7 Conclusions

In this thesis, I have discussed the complex relationship of population pressure, environmental change and rural households' livelihood strategies. Ukara is an unusual case of intensive agriculture based on traditional cultivation methods, and I feel privileged to have been able to try to understand how the local people are making their livelihood choices and what kind of impacts those choices have had in the longer term. The relevant factors are intertwined in multiple ways. The environment affects the local people's livelihoods, but whatever actions the people decide to take most often have a direct impact on their natural environment. Historically, the Kara have been particularly skilful in inventing and utilising several methods of intensive farming while meticulously conserving soil fertility. Such skills related to crop cultivation and animal husbandry, alongside with other livelihood adaptations, including out-migration, have resulted in the successful maintenance of very high population densities. Based on my findings, the local people still rely on their small-scale cultivation methods, but I have been able to establish a few larger trends within their livelihood strategies, which have contributed to the rising population densities.

The main question that I set out to answer in this study, is about the riddle of how it has been possible that the population on Ukara has more than doubled since the 1970s, from 16 000 to 37 000 inhabitants. I base my answer heavily on the perspectives offered by the local people, and it is three-fold. Firstly, a significant modification within the local agriculture is the wide-scale adoption of cassava as the main staple crop on the island since the early 1970s. Today, every farming household on Ukara is cultivating cassava, instead of sorghum and bulrush millet which are still perceived as the 'authentic' crops of the Kara by the local elders. In chapter 6.1, I have discussed the Kara farming system and the reasons for switching from growing cereals to tubers. Most importantly, cassava's clear strength over grains is that it yields more calories per cultivated hectare. By preferring cassava, the local farmers have – at least in principle – better equipped to avoid the annual hungry season, because with good planning cassava can be harvested any time of the year. In times of diminishing food reserves, this flexibility and ability to smooth consumption is valued by the farming households. In practice, this has not been as straightforward in recent years, as pests and diseases have affected cassava harvests negatively. Nevertheless, in the absence of such nuisances, cassava has allowed the

local households to diversify their income portfolios more efficiently than ever before, because its cultivation is so much less labour-intensive than that of grains.

Secondly, the Nile perch boom of the 1980s and 1990s created completely new types of economic opportunities on Lake Victoria and its many islands. In chapter 6.2 I have given an overview of the state of the fishery and the most commercially important fish species. I have explained that following the overexploitation of the Nile perch stock, the mobile fishermen were forced to follow the fish further into the more central parts of the Lake. One of the new focal points for the founding of new fishing camps was the northern coast of Ukara. Interestingly, the Kara have not been able to directly benefit from the Nile perch boom to a great extent. Due to both cultural and financial reasons the Kara men have not been either willing or able to participate in the fishing of this particular species. But the arrival of the migrant fishermen created a new impetus for the farming Kara families to engage in trade and even inter-marriage with them. More recently, the growing trade in another fish species, the silver cyprinid, has attracted a large number of young Kara men to seek employment as crew members in the fishing boats. Thus, many local Kara households have been able to successfully diversify their income portfolios through fishing and related activities, which is tightly linked to the third part of my response.

In addition to the modifications related to crop choice and the new employment opportunities with the fishing sector, my findings confirm that more households on Ukara are diversifying their livelihood portfolios through non-farm activities. In chapter 6.3, I provided a list of non-farm activities that I observed on Ukara. It is fair to assume that this occupational differentiation has – partly at least - been made possible by the fishing business. I also analysed the local livelihoods through both case studies of individual research participants' situations and by presenting the data derived from the questionnaire responded by Bwisya Secondary School's pupils. All households must have some kind of source for obtaining money in order to pay school fees, health-related costs and taxes, for instance. In the cash-stricken environment most households seem to achieve this by selling crops, by engaging in fishing or other small employment. Some households produce coal or local beer for sale. It is simply not viable to try to survive on cultivating for the households' own consumption. But as far as the income-generating activities are concerned, the households have very different starting points, which are mainly dictated by their household assets or capitals.

In my interviews it became apparent that the households that have enough labour to successfully seek non-farm incomes have been able to accumulate wealth, build new houses, educate their children and buy farmland outside of Ukara. But there are households that have not been able to benefit at all. The households that have *not* been able to diversify – especially female-headed ones - are struggling, because they cannot get enough cash to pay the necessary expenses. The most important livelihood strategy among these households has been to reduce the fallow periods of their fields and allowing cassava to grow shorter times prior to harvesting. While I have not been able to conduct any analysis on soil qualities, my interviewees were widely of the opinion that this has resulted in serious land degradation. Combined with the shock of a cassava disease hampering harvests, many households on Ukara are facing acute poverty. In times of not having enough food to eat, these households have resorted to another important strategy – using their kinship networks for borrowing staple food. Hence, life on Ukara is harsh for many, and due to land fragmentation and degrading soil quality, it is getting even more difficult. While it is difficult to establish the scale of these processes on the whole island, I remain convinced that these challenges are very much real and that they are putting many households in serious positions. None of my research participants claimed that they had faced life-threatening hunger, but it is very likely that malnutrition and stunting is affecting especially many children living on Ukara. In the short term, there is an urgent need for the governmental officials and policy-makers to react by offering a real solution to preventing the cassava disease prevalent on the island. In the long term, there is a need for further research examining the soil quality on Ukara. Additionally, it is also necessary to advance suitable, location-specific and more productive cultivation methods through better agricultural extension services and the enhanced availability of needed inputs and credit.

There is an on-going process of rapid social differentiation, which, according to some of my interviewees, challenges the traditional lifestyles of the Kara and undermines the most basic shared values of social cohesion, solidarity and mutual support. It seems clear that in the presence of the new capital-intensive economic opportunities, such as establishing a fishing camp, the more fortunate households with stronger asset bases in terms of human, financial and physical capital, are much more likely to reap the benefits. As I pointed out in chapter 6.2.3, the value chain of the Nile perch tends to give highly differentiated rewards to the different players in the production chain. In chapter 3.2.3 I scrutinised the concept of household as the unit of livelihood

construction. Regarding my fieldwork, I was eventually able to establish the boundaries of single households relatively well, although many confusing situations did occur. Nonetheless, there is a need for further research with regards to the issue of actually sharing the benefits of diversification among households. While I have been able to show that households are in different positions in terms of attempting to diversify successfully, I need to point out that most likely there are some kind of redistributive social institutions regulating the sharing of these benefits among one's community, neighbours or lineage. Such institutions remained invisible to me, but understanding how such local social networks actually function would be crucially important for determining what kind of impacts non-farm diversification has in reducing poverty among the wider population.

The main argument of this thesis is that the maintenance of the rising population densities has been made possible by the local households' livelihood strategies. The Malthusian traps of population growth have been avoided, but not in the Boserupian way of high population densities resulting in new technological innovations. Instead, by utilising the Sustainable Livelihoods Approach, I have argued that the further growth in population has been made possible by the local households modifying their livelihood strategies in the changing demographic, social, economic and natural environment. They have been able to produce more food than before, and they have been able to allocate some of their labour to the non-farm sector on Ukara. In the absence of such modifications, these households would probably have been forced to send many of their members to seek employment outside of Ukara – a strategy highlighted by Ludwig (1968) almost half a century ago. The vivid fishing business has helped in alleviating the pressure on land by providing low-paid and high-risk employment for thousands of young men. Simultaneously, the influx of fishermen and migrant workers engaging in other fishery-related activities from many parts of Tanzania have contributed to the rising population levels on Ukara. What remains to be seen is whether the seemingly temporary fishing camps that are filled with huts made of plastic bags will remain on Ukara in the longer term. Probably the most important single factor is the future availability of the Nile perch and the silver cyprinid, and the development of their respective price levels both regionally and internationally. As one respondent (P10) asserted: "If you kill the fish, you kill the fishermen, too."

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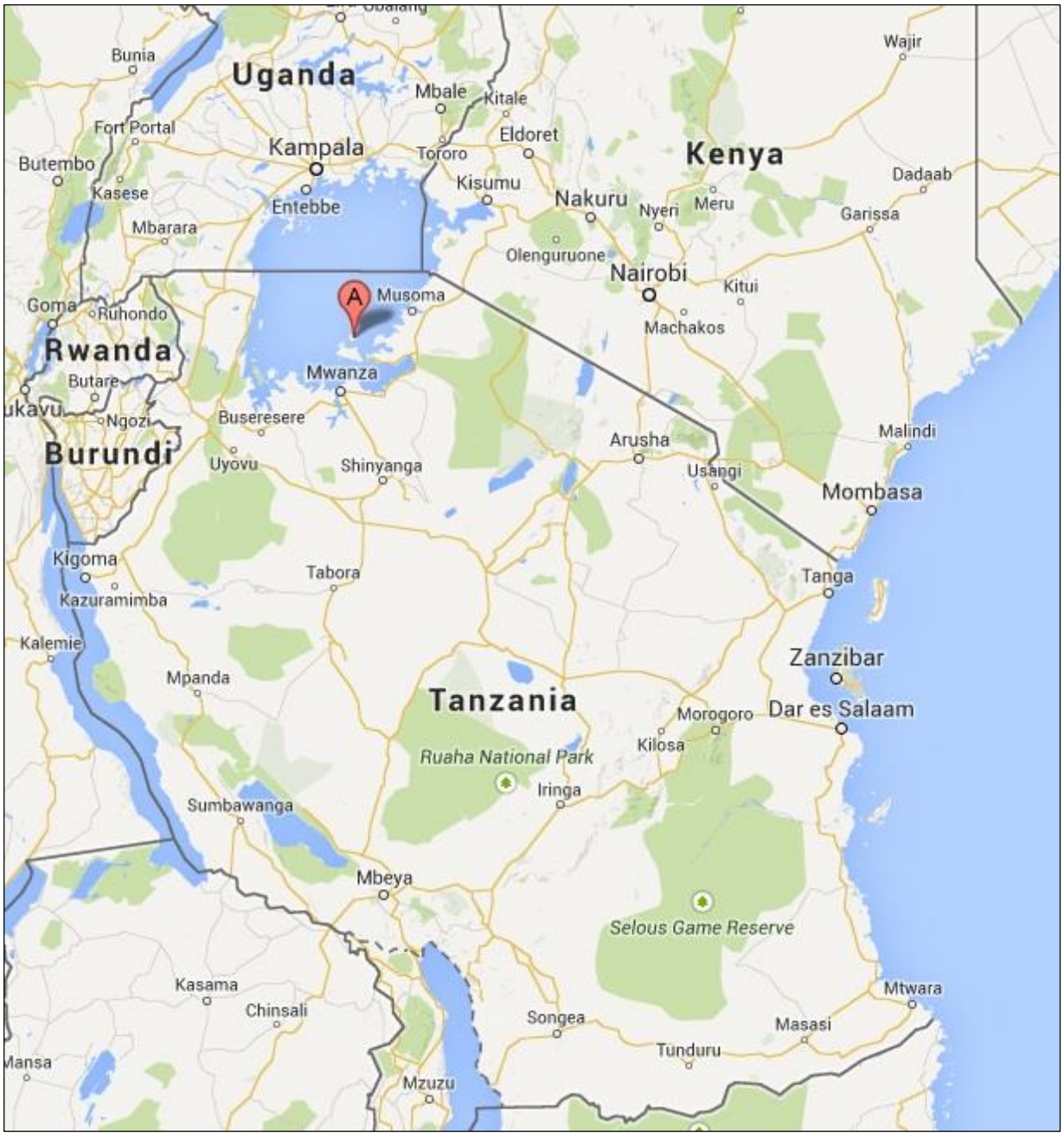
APPENDICES

APPENDIX A. List of interviews

1	Deus Naluyaga, man, 30	Research assistant/Community worker, Mwanza, Mkerewe
2	Josefu Mkundi, man, 50	Ukerewe District Council Chairperson (Chadema), Bukiko, Mkara
3	Pascal Phares, man, 25	Farmer / Tourist Guide, Ukerewe, Mkerewe
4	Woman, 71	Retired, Kome, Mkara
5	Man, 16	Motorbike driver,attending secondary school, Bukiko, Mkara
6	Man, 23	Farmer, secondary school graduate, Bukiko, Mkara
7	Man, 50	Farmer, fisherman (silver cyprinid), Bukiko. Mkara
8	Man,75	Retired, physically disabled, Bukiko, Mkara
9	Charles Tungi, man, 60	Nyegezi Fisheries College, Mwanza
10	Charles Tiba, man, 40	Regional Fisheries Office, Mwanza
11	M. Kuljiwila, man, 55	Regional Headquarters, Agricultural officer, Mwanza
12	Mwanahalisi Saleh, female, 35	Tanzania Fisheries Research Institute (TAFIRI), Mwanza
13	Samson Ibrahim, man, 40	Ukerewe District Office, agricultural officer, Nansio
14	Man, 30	SIM card salesman, Nansio, Mkara
15	Man, 40	Bwisya ward, Executive officer, Bwisya
16	Man, 50	Bwisya ward, Agricultural officer, Bwisya
17	Man, 45	Bwisya Health Center, clinical officer, Bwisya
18	Man, 45	Fishing camp owner (silver cyprinid), Bwisya, Mkerewe
19	Woman, 50	Farmer, Bwisya, Mkara
20	Man, 50	Farmer, Bwisya, Mkara
21	Man, 30	Fisherman (silver cyprinid), Bukiko, Mkara
22	Woman, 49	Retired, physically disabled, Bukiko, Mkara
23	Man, 29	Farmer, fisherman (silver cyprinid), Bukiko, Mkara
24	Man, 75	Retired, Bukiko, Mkara
25	Woman, 71	Retired, Bukiko, Mkara
26	Man, 29	Teacher, Bwisya
27	Man, 28	Policeman, Bwisya
28	Woman, 50	Owner of a small restaurant, Bwisya, Mkerewe
29	Woman, 30	Waitress at a small restaurant, Bwisya, Mkara
30	Man, 23	Farmer, Bwisya, Mkara
31	Man, 54	Farmer, security guard, Bwisya, Mkara
32	Man, 43	Bwisya Village Executive Officer, Bwisya, Mkerewe
33	Woman, 35	Ukara Division Officer, Bwisya
34	Man, 18	Farmer, secondary school graduate, Bwisya, Mkara
35	Woman, 34	Farmer, Bwisya, Mkerewe

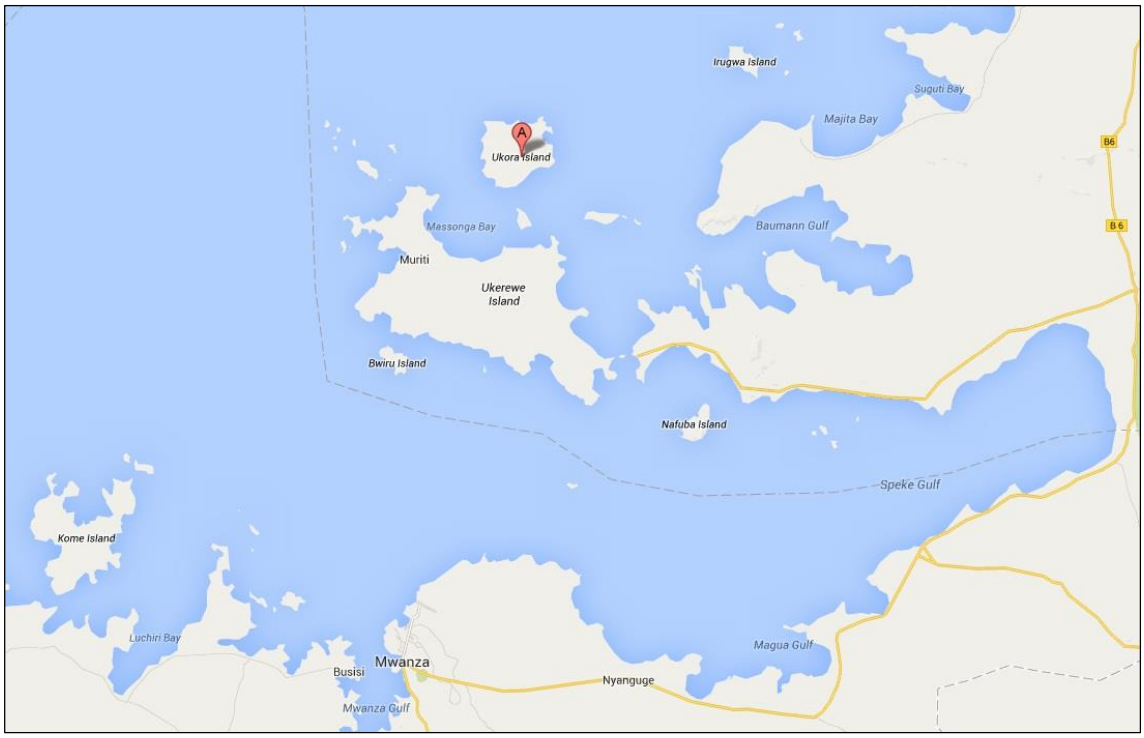
36	Man, 66	Hotel clerk, farmer, Bwisya, Mkara
37	Man, 50	Bwisya Educational Officer, Bwisya
38	Woman, 75	Retired, Bukiko, Mkara
39	Man, 67	Farmer, Bukiko, Mkara
40	Man, 39	Farmer, owner of a small local restaurant, Bwisya, Mkara
41	Man, 40	Bwisya Ward Council's Chairperson, farmer, Bwisya, Mkara
42	Man, 49	House builder, Kome, Mkerewe
43	Man, 50	Farmer, fisherman (silver cyprinid), Kome
44	Man, 41	Teacher, Kome
45	Man, 31	Fishing net maker, fisherman (Nile perch), Bwisya, Mkerewe
46	Man, 36	Neighbourhood Chairperson, farmer, Bwisya, Mkara
47	Woman, 18	Secondary school student, Kome, Mkara
48	Man, 51	Travelling salesman, Bwisya, Mkara
49	Man, 28	Fisherman (Nile perch), Chibasi, Mkwaya

APPENDIX B. Map of Tanzania



Map of Tanzania, Ukara Island marked with letter A. Source: Google Maps.

APPENDIX C. Map of Ukerewe District



Map of Ukerewe District, Ukara Island marked with letter A. Source: Google Maps.

APPENDIX D. Map of Ukara Island

Map of Ukara Island.
Source: Surveys and Mapping Division, Ministry of Lands, Housing and Urban Development, Tanzania 1976.

APPENDIX E. Questionnaire forms

In English:

QUESTIONNAIRE - Bwisya Secondary School, 18.2.2013
1. Name
2. Age
3. Sex
4. Form
5. Ethnic group
6. Place of birth
7. Place of current residence
8. How many people live in your household (kaya)? What are their relations to you? How many houses are there in your household?
9. Have you always lived in the same village? If not, where did you live before and when did you move to your current place of residence?
10. What type of activities do members of your household do for living? Please describe all of them and elaborate on who is responsible of which activities.
11. What is the division of labour between men and women in your household? Who makes the decisions on farming and cultivation activities?
12. Do you keep cattle of other animals? If yes, how many of each kind? Do you collect animal manure for use on the fields?
13. Does your household cultivate fields? If yes, which type of crops? Please estimate the size of your total area of cultivation. What is the average cultivated area for each crop? (For example: cassava, rice, sweet potatoes,

14. Does your household use hired labourers in cultivation? If yes, for which field activities mainly and what time of the year?
15. Have some members of your household moved away? If yes, for what reasons did each member move and where did they move to? How often do they return to live with your household? How long do they stay? Do they still contribute money towards your household?
16. How do you obtain money to pay your school fees? Have you ever had problems in paying your fees on time?
17. Are there any other problems or challenges that prevent you from performing well at school or living a good life? If yes, please explain what kind of problems or challenges.
18. What are your plans after completing your secondary school studies? Have you thought about moving out of Ukara? If yes, where have you thought about moving?

In Swahili:

MASWALI MAFUPI MAFUPI - Bwisya Shule ya Sekondari, 18.2.2013
1. Jina
2. Umri
3. Jinsia
4. Form
5. Kabila
6. Mahali ulipozaliwa
7. Mahali ulipoishi sasa hivyi
8. Kuna watu wangapi kwenye kaya yenu? Unauhusiano upi na watu hao? Kuna nyumba ngapi kwenye kaya yenu?
9. Huwa unaishi kijijini kwenu? Kama hapana, ulikuwa unaishi wapi kabla, na umehamia lini huko unapoishi?
10. Je, watu wa kaya yako wameshawahi kuondoka? Kama ndiyo, ni sababu ipi iliwafanya waondoke na walienda wapi? Walirudi baada ya muda gani kuishi na ninyi kwenye kaya tena? Walikaa kwa muda gani? Je, bado wanatoa msaada wa hela au mchango wo wote kwenye kaya yenu? Kama ndiyo, eleze ni aina ipi ya mchango wanatoa.
11. Watu wa kaya yako wanajihusisha na shughuli gani? Tafadhali elezea zote na mtu anayehusika na shughuli hizo.
12. Je, mgawanyiko wa kazi kati ya mvulana na msichana ukoje kwenye kaya yenu? Nani anapanga shughuli za shamba na kilimo?
13. Je, mnafuga ng'ombe au wanyama wengine? Kama ndiyo ni wangapi? Je, huwa mnakusanya mbolea kwa ajili ya kilimo?

14. Je, kaya yenu inalima mashamba? Kama ndiyo, ni mazao ya aina gani? Tafadhali kadiria ukubwa wa mashamba yenu. Ni wastani upi wa mazao mnapata kwenye kila mazao?
15. Je, kaya yako inalima mashamba ya kutoa mazao ya kutosha kwenye kaya yenu? Ulishawahi kuumwa njaa kwa sababu ya kukosekana kwa chakula? Kama ndiyo, hili lilitokea lini na kaya yako ili tatua swala hili?
16. Je, kaya yako inatumia nguvu ya ziada katika kulima mashamba? Kama ndiyo, ni shughuli zipi za kilimo na ni wakati upi katika mwaka?
17. Unapataje hela ya kulipia ada yako ya shule? Ulishawahi kupata tatizo katika kulipa ada? Kama ndiyo, ulilitatua vipi tatizo hilo?
18. Je, kuna tatizo lo lote au kikwazo kuzuia usifuatilie vizuri masomo yako na kukufanya ushindwe kuishi maisha mazuri/bora? Kama ndiyo, elezea ni matatizo au kikwazo kipi.
19. Unamalengo yapi baada ya kumaliza shule? Umeshafikiria kwa makini kabisa kutoka nje ya Ukara? Kama ndiyo, umepanga unaenda wapi na kwa sababu zipi?